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PEDIATRICS

Vol. XIX JANUARY, 1907 No. 1

ORIGINAL ARTICLES

CLINICAL REPORTS OF SARCOMA OF THE KIDNEY IN CHILDREN.*

By Arthur H. Bogart, M.D.,

ASST. SURGEON TO THE METHODIST EPISCOPAL AND KINGS COUNTY HOSPITALS.

During the past eight years the writer, in connection with his work in the Children's Department of the Methodist Episcopal Hospital, has had an opportunity to see three cases of sarcoma of the kidney in children, and personally to operate upon two. The third was operated by Dr. J. B. Bogart, in whose ward they were seen.

Case 1. I. F., age 6 years; female. Family history: Six other children, all well. Past history: Patient suffered from inflammation of the bowels one year ago. Present illness: Eight months previous to admission, Dec., 1895, first noticed a tumor in the abdomen. It first appeared in the lower part of the abdomen and grew upward. During this time patient has had occasional attacks of vomiting, usually once a month, and lasting a few days at a time.

Examination: Revealed a tumor filling the entire abdomen and crowding the ribs upward outward. The veins of the abdominal wall were enlarged and tortuous, and the umbilicus projecting. The tumor rose higher on the left side than on the right, and had a hard nodular feel. There was flatness over the entire abdomen, except at the epigastrium; the mass was not equally firm in all places.

Operation. Dr. J. B. Bogart: Median abdominal incision made for exploratory purposes, and the tumor found to be movable. This wound was closed, and a second one made, beginning at the border of the erector spinæ muscle behind and extending forward to the rectus muscle in front. Through this incision the left side of the tumor was easily enucleated, but the capsule of the right side was so firmly adherent to the intestines and peritoneum as to make enucleation impossible. During this manipulation the capsule was ruptured and a large amount of soft material escaped, leaving a cavity which was packed with gauze to control hemorrhage. Patient died of shock soon after operation.

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*Brooklyn Med. Jl.

CASE II: SARCOMA OF THE KIDNEY (LEFT) NEPHRECTOMY. METASTASIS IN RIGHT LUNG.

H. H., three years, male. Family history, negative. Personal history: Patient has had no diseases of childhood aside from present trouble. One year ago, mother was told that the child should be operated upon for tumor of the abdomen; tumor was then quite large and has slowly increased in size since that time. Mother says child seemed in usual health up to two months ago, when he had a convulsion; since then he has lost flesh and strength and has grown pale and is short of breath.

Examination: Patient is rather poorly nourished, somewhat anemic; tongue, clean and moist; expression, worried. Head, large. Skin, delicate and pale. Pulse, rapid, regular and good force. Heart, negative. Chest, ribs prominent; lower ribs spreading. Lungs, respiration rapid; left chest, negative; right, liver dullness in front, abnormally high; normal pulmonary breathing and resonance above third interspace. No adventitious sounds behind; liver dullness high. Abdomen, distended by a tumor occupying chiefly the left half, its outline easily visible. It is irregularly spherical in outline, and by its encroachment upon the lower ribs causes them to spread. Tumor is firm, nodular; skin is freely movable; percussion over tumor is dull, while the right half of the abdomen is tympanitic.

Operation: Five-inch oblique incision running transversely forward and inward from the erector spinæ muscle behind; tumor exposed and numerous adhesions between it and the peritoneum and small intestines separated, these with the vessels at the pelvis of the kidney ligated and tumor removed. Peritoneum sutured with chromic gut. The muscles were also included in the same suture. Subcuticular of chromic gut. This operation occupied twenty-four minutes. The pulse rose during the operation from 120 to 140, but the patient suffered only moderate shock and reacted promptly. Patient made a good recovery from the operation, but continued to suffer from dyspnea. The dullness over the lower portion of the left lung increased rapidly, until at the end of ten days after operation, when the patient died, there was evidence of complete consolidation of the entire left lung.

Autopsy: Body well nourished. Wound of operation between lower border of ribs and crest of ilium on left side. Thorax explored through abdominal wound and diaphragm. Left lung and heart normal. Right lung removed and found to be the seat of a large infiltrating neoplasm, resembling sarcoma. Abdomen: no left kidney present; right kidney; capsule stripped easily; pyramids slightly injected; small amount of pus in ureter and pelvis of kidney. Stomach, pancreas and spleen normal. Peritoneum normal.

Cause of Death: Cachexia from malignant growth in the lung.

Pathological Report: A symmetrical, spheroidal, fibro-cystic appearing mass, 14 c.m. in diameter; surface smooth; fluctuates in many areas; considerable variation in mural thickness; where sections had been removed, a markedly multilocular cystic arrangement is discovered, a few shreds of adhesions present on the external surface.

Microscopical Report: Round and spindle cells—sarcoma.

Lung Pathological Report: Right lung an irregular, nodular, rough mass, with a great excess of fibrous tissue. The edges of the lung alone appear like pulmonary tissue, the remainder of the organ resembling softened, degenerated neoplasm; imbedded in the lung is a smooth, egg-shaped mass, 7 by 8 c.m., surrounded by a pseudo capsule. There are blood clots in the smaller vessels. Vascular supply is generous.

Microscopic Report: Round cell. Sarcoma.

SARCOMA OF THE KIDNEY.

Case III. E. M., 16 months, female. Family history has no bearing on the case.

Past History: Breast fed until fifteen months old. Always well nourished. Present illness: About two weeks previous to admission, mother first noticed a swelling in the right side of the abdomen, which has gradually increased in size. Since this time patient has been more fretful and has taken less nourishment; there has been no digestive disturbance. Patient has cried and moaned at times as if in pain; urination less frequent and no blood.

Examination: Child fairly well nourished, with pale, whitish skin. Veins of the abdomen prominent. Acts as if unconscious of surroundings. Chest, heart and lungs negative; abdomen, generally distended. The right renal hypochondriac umbilical and iliac regions are occupied by a tumor, which is flat on percussion and continuous with the liver dullness above, it extends one-half inch to the left of the umbilicus, and to within one-half inch of Poupart's ligament, and is somewhat cystic in feel.

Examination of the eyes by Dr. J. S. Wood reveals complete absence of the iris in both eyes, imperfect vision, and nystagmus due to difficulty in seeing clearly. No evidence of intracranial disturbance.

Operation: A transverse incision, four inches in length. Pedunculated tumor attached to the capsule and the cortex of the kidney delivered, tied off and removed.

Bi-section of the Kidney: Removing a diseased section, wound closed in layers with continuous chromic gut suture. This operation lasted thirteen minutes and was accomplished with very little difficulty, there being no hemorrhage and very few adhesions.

This patient suffered comparatively little shock as the result of this operation, and left the table in excellent condition, but died suddenly twelve hours later.

Pathological Report: Weight of tumor 850 grammes; it is an oval mass of lawless tissue 13 c.m. in diameter, with an irregular rough exterior, consisting of a capsule and pseudo capsule intimately associated with the deeper parts of the tumor by numerous connecting trabeculæ. On section there is seen a fairly uniform concentric arrangement of the tumor in dense lamellæ; the centre of the mass is softer than its periphery, apparently having undergone degeneration. There are numerous areas of hemorrhage and brown pigmentation.

Microscopical Diagnosis: Round cell sarcoma.

The prognosis in these cases is absolutely hopeless without operation. In view of the fact that successful cases have been reported (notably two by Abbe) in one of which the patient remained well at the end of ten years, it becomes our duty to advise it in all except extreme cases. There can be no doubt that there is a time in the history of sarcoma of the kidney, like all other malignant growths, when the disease may be attacked with a reasonable hope of cure. It is to be regretted, however, that these cases, like many others of a similar nature, are permitted to go until too late. In the case of the boy three years of age, operated upon by the writer, this patient was seen by a physician one year before, who advised waiting until the child grew older.

When we remember that 94 per cent. of new growths of the kidney in children are malignant, such advice seems unfortunate; there *should be no doubt* as to the proper course to pursue in all suspected cases.

The operation of nephrectomy for sarcoma has, in the writer's experience, been comparatively simple. In one case it lasted thirteen minutes, in the other twenty-four; in one the patient apparently suffered but little shock at the time of operation and left the table in good condition, but died suddenly within the next twenty-four hours.

In the other case the pulse rose from 120 to 140, this case recovered completely from his operation, but died ten days later from pulmonary involvment, which was undoubtedly present at the time of operation, though not recognized.

In the other case, operated by Dr. J. B. Bogart, the operation was extremely difficult, owing to dense adhesions and hemorrhage, and finally had to be abandoned.

The transverse incision from the erector spinæ muscle forward, parallel with the lower border of the ribs, is very satisfactory and to be recommended. In all cases one should have a clear idea of what he purposes to do and proceed to do it as rapidly as possible, avoiding unnecessary loss of blood. The question of drainage had better be determined at the time of operation. In one of the writer's cases he was able to close the wound at once; if, however, the oozing be considerable this will not be possible.

Early recognition and early operation will reduce the mortality of sarcoma of the kidney in children. It is the disease and not the operation which is to be feared.

THE OPSONIC THEORY*

Sir Almroth Edward Wright, M.D., F.R.S.

When I was asked to give this inaugural address I was overcome with the feeling of responsibility in addressing so many people, for I have not addressed more than half or a third of this number at one time, and of course responsibility increases with the number of auditors. Again, when I came to consider the subject matter of my lecture I thought of addressing you on the "Physiology of Belief." When I suggested that subject to some of my fellow passengers on the steamer they said, "Anything else but that"; but I still want to leave it in doubt whether I am going to address you on the "Physiology of Belief" or as an alternative on some of the work I have been doing with my pupils on inoculation. I hold that the physiology of belief would be far more interesting and far more important. It would be a disquisition on the changes that occur in the body when you accept anything as true, and the evidence on which you accept things as true. The most important faculty of the human mind is not to remember things told, nor is it even to comprehend and pick up things given, but it is judging between truth and falsehood, and if I could in an hour's time tell you the test whereby you could determine whether the things you believe are true or not, I think I should have done more service than if I gave you one shred of knowledge that we have collected in our work. But I know your feelings would be against that, therefore I am not going to address you on the physiology of belief and why we accept some things as true and others as not true, but I am going to put that aside and consider the alternative subject, which is the treatment of certain diseases by inoculation. The work I am going to bring before you indeed is not my work alone, for I have had a number of very zealous students with me. When I tell you we can get men to sit up till three o'clock in the morning, not one day alone, but day after day, in order to plot the curves which hang before you, and that every dot in those curves represents three or four hour's work as a rule, and that we have people who will take curves like that and sit up night after night, dividing the night into watches, in order to see what happens with the protective substances in the blood in the course of a fever, you will understand that I speak with very great thought of all the men that have helped me to do this, and not the least among them is one that has come from among you, Dr. Ross (applause). As I have said I have had a number of earnest co-workers, and it is only by the combined effort of a number of people that you are able to ascertain the facts put before you in these numerous diagrams.

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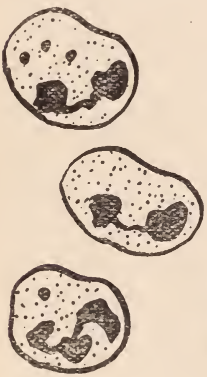
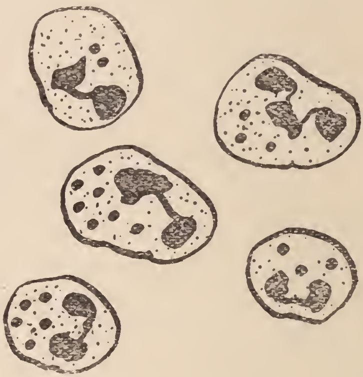
*Opening lecture of the Medical Faculty, University of Toronto, for season of Oct. 3, 1906.

Let me tell you the subject matter about which I am going to discoure to you. Whatever opinions you may hold about medicine, there are some who believe that medicine is a very effectual thing, and mankind has discovered the secret of *curing* all kinds of diseases. As a matter of fact man has discovered the way to *tend* diseases. Disease is like a flood along the banks of which the medical man goes so that he may watch it, and prevent an excessive amount of damage. That is about my idea of medicine. You had better take it in this way: Man has a great control over disease, but there are some diseases over which he has very little control, and in these cases all he can do is to adopt the expectant treatment, that is, to sit by the patient's bedside and feel his pulse and take his temperature and let nature play her part. Nature does play her part very often and brings a number of people through. In typhoid fever she saves nine out of ten, and sometimes nineteen out of twenty. There are some cases where the records are very much worse than that. In the advanced cases of phthisis you say everybody is going to die; in the case of boils the medical art is able to do very little, and even in those trivial diseases such as pimples on the face, which make some people miserable from the age of 15 to the age of 30, medical art is notoriously unable to avail much. In such intractable cases what are you going to do? You can either wait till somebody gets a cure by definite inspiration—and if you look at the advertisements, even the advertisements in Toronto papers, you will see that there are a great many people who profess to cure all sorts of incurable diseases. You cannot believe in those "cures," because you know Nature does not give cures into the hands of people without work. Nature takes ample care that nothing is found out except through an infinity of work. In the case of those incurable diseases you have your choice, you can either go to the advertisements in the papers for cures, or you can say, "It is a task for me to sit down and study these conditions very carefully and see if a cure will not come out of the proper understanding of them." I have had problems of that description thrust upon me in the different rôles I have had to occupy. For instance, I was connected with the Army as a civil professor and we used to see great numbers of people come back from India wrecks from typhoid, and the returns showed that about two per cent. of a battalion were attacked with typhoid every year, and that half of that number died. There was no remedy for that unless a remedy could be sought at the hands of Science. I sat down to work with my assistants and we studied the problem of resistance of the blood against typhoid fever, and we elaborated a system of inoculation which I think is doing useful work in the world. I am not going to discourse to you about preventive inoculation against typhoid—that lies rather remote from your life. The chances of getting typhoid even here in Toronto are not sufficiently great to induce people to undergo preventive inoculation against typhoid. But I began working on that matter, and when anti-typhoid inoculation had come to an end for a period, a man chanced to come to me who was covered with boils from head to foot. He had had blood poisoning some nine years before, and his beard was in a state of severe inflammation; he had styes in his eyes and his life was a misery through his staphylococcus infection—staphylococcus being a microbe that grows on and in the skin. Now this man had very little resistance against this particular microbe and therefore staphylococci grew freely in his tissues. Instead of an ointment I applied some of the knowledge we had acquired in connection with typhoid to the treatment of this man and we were very successful in getting him entirely well.

This is only an aside to tell you how the work began. The point I want to impress is that you have to study the question of bacterial disease very carefully. Why do microbes invade the body? What does Nature do to ward off these microbes or to cure the invasion after it has begun? These are the problems I want to consider with you for a time. You have learned, or will learn in your classes that when you introduce a microbe, such as the staphylococcus, into the artificial nutrient media we employ in the laboratory, that it increases and millions of microbes are produced in a very few hours. It is obvious to consideration, if you sit down to think of it, that the blood cannot be such a medium as our artificial laboratory medium. When you introduce microbes into the blood they do not proliferate at random in that fashion. There are protective or bacteriotropic substances in the blood that prevent them growing and increasing in the body. You will suggest that the blood might not be a proper nutrient medium, but bacteriological investigations show that the tubercle bacillus, the diphtheria bacillus, and the staphylococcus all grow extremely well in the blood; in fact that they grow by preference in the blood. Therefore the explanation cannot be that the blood does not contain nutrient media. Our bodies contain very succulent food indeed, and the microbes would be only too glad to live on us. When you consider how the blood differs from the nutrient medium used in the laboratory, you find two outstanding differences. To begin with, it contains white blood corpuscles, and these have the faculty under certain circumstances of picking up the microbes and ingesting them and killing them. Now the blood fluids are not simply an indifferent medium—as Metchnikoff the author of the theory of Phagocytosis thought. In other words the blood differs from the broth not only in the fact that it has white corpuscles, but that it also contains substances which act on the bacteria. They act upon them somewhat after the manner of antiseptics; the analogy is not very close, but it is something of that sort. In other words your blood represents a fluid somewhat comparable to weak corbolic acid in which are white corpuscles. These antiseptics in the blood may be partly responsible for keeping the blood free from bacilli, but are not wholly so. By a certain technique we found that it was possible to separate the white corpuscles from the blood fluids, to test them separately and see what white corpuscles could really do. So we took white blood corpuscles obtained from our own blood and an emulsion of bacteria, mixed them together in capillary tubes, kept them at blood heat for about half an hour and watched to see what occurred. We were astonished to find that under those circumstances the white corpuscles did not ingest the bacteria; and therefore it looked as if the white blood corpuscles were of no use at all. Then we mixed with the bacteria and the white blood corpuscles a portion of the fluid of the blood, and we found the fluid of the blood influenced the microbes in such a way as to prepare them for ingestion. If you will refer to this diagram (Fig. 1), you will see that almost all of the white blood corpuscles have picked up tubercle bacilli. We found then that when you mix bacteria and white blood corpuscles together the white blood corpuscles have no power to taking up the bacteria; but when, on the other hand, you add the fluid of the blood to the mixture of leucocytes and bacteria, the fluid of the blood alters the bacteria in such a way as to make them palatable for the white blood corpuscles. In other words the blood has prepared the bacteria for ingestion. For this phenomenon we had



NORMAL BLOOD.
20 Staphylococci in 5 White Blood Corpuscles.
Opsonic Index . . 1.0
(Schematic)



PATIENT'S BLOOD.
10 Staphlyococci in 5 White Blood Corpuscles.
Opsonic Index . . 5.0
(Schematic)

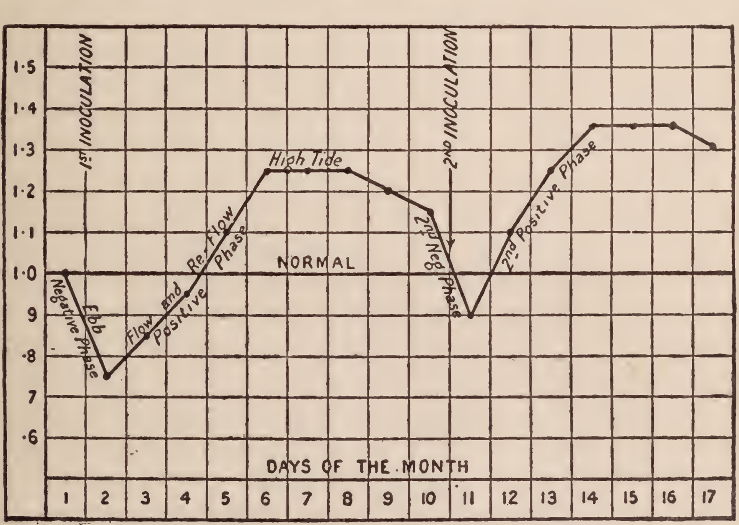
to find a name, and spending some time over Greek and Latin dictionaries we found the word *opsono*. Opsono means, "I prepare for dinner"; it must be sharply distinguished from an almost identical word which means, "I advertise or proclaim with a trumpet." These substances that prepare for ingestion are what I wish to speak of as *opsonins*. It was a question at the same time whether the white blood corpuscles or the opsonin in the blood was the more important agent. In order to answer this question we took a patient who was very badly infected with the tubercle bacillus, and we contrasted the blood of this patient with what we call "pool." Now "pool" in our laboratory language means the pool of blood of all the normal men in the laboratory. Everybody when he come into the laboratory bleeds himself; he sticks a needle into his finger and draws blood off and contributes his few drops to those of his fellow workers. So pool is made and no man who is not normal may contribute to pool. When we catch a tuberculous man contributing to pool he has such a bad time he never comes near us again. With our pool blood as control we contrasted the blood of this highly infected tuberculous patient of whom I spoke, and we investigated the question as to whether the patient's white blood corpuscles or the opsonins in his blood were deficient. Without wearying you with the details of this experiment I will ask you to accept the results. We found that the white blood corpuscles of our patient were just as active in phagocytosis as were our own normal white corpuscles, but that the patient's serum was only half as active as our own serum. Hence if we express the activity of normal serum for phagocytosis as 1.0, cbviously we must express the abnormal activity of the patient's serum as 0.5. These figures represent respectively what we term the opsonic index of the normal person and of the diseased.

The first generalization I will ask you to remember, therefore, is that every patient, at any rate in the early stage, in the uncomplicated stage, who is infected by bacteria under ordinary circumstances has got diminished resistance, and that deficiency of resistance does not reside in his white blood corpuscles, but resides in the fluids of the blood. In other words, you can say that a patient with a low opsonic index is at least a candidate for infection by a particular microbe. One could go through a series of people and find out whether they had a normal power of resistance against the tubercle bacillus, or a diminished power of resistance, and in a world which is filled with tubercle bacilli you may be sure that a person with a diminished resistance becomes a patient; for we live in a world where no person reaches mature years without meeting the tubercle bacillus. Whether he is infected or not depends on his power of resistance. We find that a patient in the early stage has a low resisting power and we assume that if we had been able to get him before infection we would have found him in the same condition.

So far all this is only legitimate gratification of the intellect. We are able to explain to ourselves now why in a world where we all come in contact with infection, some people take tubercle and some do not take tubercle, why some get boils and some do not get boils. Some advertise in the street that they have a small resistance to the staphylococcus, because they have spots on the face. So one sees that resistance is the important thing. The next point is, What is the good of that unless you can alter it? and when you throw back your thoughts to what has been done in connection with the prevention of infectious disease you will see that inoculation is resorted to. Commonly when we speak of inoculation we mean vaccination, and people that are subject, as we all are, to attack by the smallpox microbe take precautions through inoculation that they have a higher resisting power. Therefore the question suggested itself in connection with the patient I spoke of with the boils whether something could not be done in the way of inoculation to increase his resisting power to the particular microbe that affected him. In order to do that we must first study what happens when the microbe attacks the body. That meant that we must undertake an experimental inoculation with the particular microbe under consideration. For obvious reasons we could not use living bacteria, but we could use bacteria which had been devitalized at a comparatively low temperature—so low that though life was rendered extinct the chemical constitution of their protoplasm was not greatly altered. So we took cultures of our bacteria and killed them at 60° centigrade, thus obtaining what we call a "bacterial vaccine."

Now, when we put a proper quantity of vaccine into the body what happens? (Vide Fig. 2). The beginning of the tracing represents the normal, healthy resistance. At that point, indicated by an arrow, an inoculation is performed. When we test the resistance afterwards we find it reduced. That is called the "negative phase." The inoculation of a considerable quantity of vaccine thus reduces the resistance of the patient. Then after a time we find that the resisting power increases. That is spoken of as the "positive phase." Then after a time it falls away and eventually the blood of the patient does not differ very much from the normal. In other words, after inoculation there occurs first a diminished resisting power and afterwards an increased resisting power; that increased resisting power lasts for a period and then it falls away. Now, when the resisting power has fallen away the patient is not what he was originally.

He has retained the faculty of rapidly manufacturing protective substances again, these opsonins, as soon as he is re-inoculated. We wan to know what happens when we give a second inoculation. After the first there occurs the negative phase and then the positive phase; and on the declining wave of the latter we re-inoculate. The opsonic power goes down again and then rises higher than before and so on in this step-ladder fashion (vide Fig. 2). At one time we thought it was only a question of inoculating a man at definite periods to increase the resisting power to very many times the normal. That can be done in the case of typhoid, and ocassionally though to a lesser degree in certain other infections, but I would have you consider this "positive summation" as the exception rather than a rule. One can, however, usually increase the effects of a primary inoculation by a secondary inoculation, though one cannot do so indefinitely. But there is another and a serious aspect of the question. Here is an inoculation (referring to a chart) after which the resisting power runs down; but after a time it rises and the patient is re-inoculated with a large dose; the resistance goes down further and before he can recover another dose is given and the resistance goes down still further. So anybody can inoculate with successive doses and reduce the resisting power to anything he likes. It is quite easy by this method to reduce the



* Diagram of opsonic curve—varying as a result of inoculation.,

resisting power of the blood enormously. There is no doubt that when Koch brought out his method of inoculating with tuberculin he inoculated with too large a dose and produced a fever; as soon as the fever was over he gave another inoculation; as soon as the fever produced by that was over he gave another inoculation, and eventually many of the patients so treated got a general infection and died. This is the reason why you cannot inoculate at random without testing the blood every time. If you inoculate, giving excessive doses, although you are not anxious to do it, altthough you are anxious to avoid it, you may be reducing the resisting power of the patient by each successive dose. Therefore we have these considerations to keep before our minds that after every inoculation the resisting power of the blood lessens and then it increases, and that when it is increased you may give another inoculation and keep it up. This is the only course we now take in connection with inoculation. We try to get only a small negative phase and a fairly big positive phase; when this is falling off we give another inoculation and so keep the patient on an average considerably above normal. Let me now summarize the principles of inoculation; after you have found that a patient is infected with a microbe you isolate the microbe in pure culture and then test the resistance of that patient's blood to see whether or not it is able to kill off that microbe as well as normal blood can. If he is not able to do so, you inoculate with the proper vaccine, with vaccine made from staphylococcus if it is staphylococcus infection, from the tubercle bacillus if it is tubercle infection, and so on. Throughout the whole course of inoculation we endeavor to keep the resistance of the patient's blood as high as possible.

Let me now tell you of the results I got by inoculating two little girls who had been staying at a seaside resort along with a patient who had phthisis. They developed tubercular glands in their necks. They were brought to me and I tested their resistance to the tubercle bacillus and found that one had an opsonic power of 0.8 and the other 0.6 of the normal. I then undertook inoculation of these children with new tuberculin, carefully safeguarding each inoculation by an investigation of the blood. One got quite well, and the other was quite well for about a year; after that a small portion of an infected gland caseated and had to be discharged. Recovery then went on uninterruptedly.

I have led you to expect that you would find that patients affected with a bacterial disease were always lower in their resisting power than normal persons. As a matter of fact you would not have made many examinations of patients before you would find that that was not always so. Ordinary clinical observations should lead to a similar conclusion for if a patient's resistance is lower than the normal throughout the course of typhoid fever, what chance is there of his killing off his microbe? Obviously if a patient does not react to the typhoid bacillus the typhoid would always get the better of him, but we know that in the course of typhoid fever as in all bacterial fevers the body makes an effort to throw off the disease, in other words the body inoculates itself. As soon as the poisons get into the blood the body sets to work to produce protective substances and there occurs the phenomenon which we speak of as "auto-inoculation." You may get auto-inoculation progressing favorably as in about four out of five cases of typhoid fever. In fact the patient gets well of his typhoid because he inoculates himself from his bacterial focus and thus produces his own protective substances. In cases in which you have a strictly local infection, however, such as tubercular glands, such as acne, such as all those purely local diseases where you have not constitutional disturbances, the body takes no steps to protect itself and the disease runs on practically indefinitely. You may find the disease lasting through life, and then you will find the opsonic power low. This is because the bacterial focus is closely shut off from the lymph and blood streams and consequently no auto-inoculation can take place. In many of those cases where the body is not inoculating itself you can inoculate for it and bring about a favorable result. Let me refer to a case of empyema which was treated by Dr. Ross at the Victoria Park Chest Hospital in London. The patient's acute symptoms were over, but the conditions seemed to be going on indefinitely. Investigation of pus from the sinus gave a pure culture of pneumococcus. On testing the patient's blood to the pneumococcus it was found to be normal on two occasions; but that makes no great difference, for if the normal resisting power of the patient is not enough to kill off the microbe, what are the indications? Obviously you should increase that power and get a higher power. An inoculation with a vaccine prepared from his own microbe was undertaken and immediately the opsonic index rose from 1.0 to

2.4. Two more inoculations were undertaken at appropriate intervals as shown by examinations of the patient's blood and in the short space of two weeks the discharge ceased, the sinus closed and the patient was discharged cured.

Here happens to be the chart of another case of Dr. Ross's (referring to chart). It refers to a boy who had tubercles on both irises. Inoculation with new tuberculin in proper doses and at appropriate intervals greatly increased the resistance of his blood and maintained a high degree of opsonic power for many months. Although the eye surgeons had seriously considered the advisability of removing an eye (so severe was the involvement of one iris), the patient has so improved under this treatment that his eyes might easily pass for normal and doubtless they will get completely well.

The next case we shall consider is one that has some interest because it shows us that when some cases get well of themselves it may be due to the fact that auto-inoculations have taken place. The patient was a child who had a tubercular knee. While lying in bed two observations were made, and the resisting power upon both occasions was normal. Then the patient's affected knee was massaged. When you massage a part what you do is, you knead it and you press out the fluid from that part into the blood or lymph system. If the tubercle bacillus happens to be growing in a knee, your message is the equivalent of an inoculation from the fact that you are driving out into the circulation fluid infected with the bacillus. After our first massage there was a lowering of the opsonic power, but the patient came up to normal again. With another massage we got the same result; and to show that this auto-inoculation was the same as an inoculation put under the skin, an inoculation was undertaken with new tuberculin when we obtained a series of events similar to that which had followed massage. Our next case is that of a patient with gonorrhocal arthritis affecting the knee. The patient was taken to the hospital, where the resisting power was found to be very low; he was inoculated with gonococcus vaccine, and the resisting power to the gonococcus went up very definitely. At that period the patient was put on massage. The knee joints only were massaged and immediately after we found that the resisting power of the blood went down and then rose again exactly as it does with an inoculation of a vaccine. Here again we did two more massages, and the same series of events occurred. In association with the great increase of opsonic power all the other joints cleared up; even the joints that were not massaged, the shoulder joints and clavicle joints got well. It would therefore appear that the tendency of bacterial disease to get well of itself, is due to the fact that in the course of the disease auto-inoculation is taking place constantly and that you get increased resisting power as a result of this. However, the auto-inoculation that takes place may be very ill-adjusted. Sometimes you get inoculation of much too large a dose and then you find a diminution of the resisting power instead of an increase. A friend and pupil of mine came up to work in the laboratory; he was the subject of phthisis. We found his resisting power was above the normal, 1.4. He spent a long and tiring day in the laboratory learning opsonic technique, and the next day he had to take to bed. We then found that the resisting power of his blood was down to 0.4. He took a fortnight to recover. Obviously the explanation of this unfortunate occurrence was, that man by working too hard caused changes in his circulation, drove out poisonous substances from his lungs into his blood stream and got the same effects as he would get by a larger inoculation of new tuberculin, in other words, a very formidable negative phase; the positive phase that came a fortnight later probably did not recompense him for his long period of lowered resistance. This is the life of a patient with severe phthisis. He does work and tires himself, gives himself an auto-inoculation and gets ill, gets well a fortnight afterward; and so seesaws between a low and a high opsonic power. By such your tubercle patient is very little likely to get well, and we do not look with kindly eyes on auto-inoculation, because we feel it is often done in too large doses, and done indiscriminately. You cannot ask a patient to go and dance to bring on an auto-inoculation, because you do not know how big an inoculation he is going to give himself. What you have to do is to keep him for as long a period as possible as high as possible above normal. If the patient should get down much below normal the tubercle bacilli may take the opportunity to spread throughout his body and he may get general tuberculosis. The negative phase has to be closely watched, and you have to test the resisting power of the patient after each inoculation. You must give such a dose of your vaccine that will not reduce your patient's resisting power much (a dose that produces practically no clinical result), and yet large enough to give a good positive phase following a slight negative phase. I want to point out to you also that in the class of case which we speak of as septicemias, that is where the microbes have got into the blood stream, the patient frequently inoculates himself and gets through his fever, but notoriously there are cases in which he fails to do so. Hence certain types of general infection or septicemias are nearly always fatal. Such a type is malignant endocarditis where the microbes get into the blood stream and attack the valves of the heart. These cases nearly always come to a fatal end. We have a case of that sort, which we inoculated, and you may wonder at our courage in inoculating such a case. You would think to yourself that if you inoculated a patient who was already suffering from too much microbe you would certainly make him worse, but you have got to consider that the microbe is in the patient's blood. This situation is not the most favorable for the production of protective substances. When we do an artificial inoculation we put our vaccine into the subcutaneous tissues. There is very little doubt that this is a great deal more effective in making protective substances, than if we inoculated directly into the blood stream; furthermore, you do not get poisoning effects if you inoculate the patient into the subcutaneous tissues. Knowing those facts we favored inoculation in this case of malignant endocarditis where the streptococcus was in the blood itself and was attacking the valves of the heart. I saw the girl; she was about 18 or 19 years old. Her illness had begun with a severe sore throat; then a large tumor came in the side of her neck and it was supposed to be an inflamed gland. It disappeared of itself; but the microbes got into the blood stream and then she developed a high temperature which had been continuing for six or seven weeks before we came on the scene. Before this, however, the patient had been treated in various ways: first she had had many kinds of drugs. Drugs I take it are ineffectual in killing microbes in most cases. Then she had anti-streptococcus serum in large quantities. I take it that the anti-streptococcus serum is not a good method of treatment; but it would take me much too long to enter into that question here. In this particular case it certainly had no effect. For weeks she had daily inoculations of serum and yet her temperature went on as high as ever. At the end of about six weeks we came in and made cultures from the blood and found the streptococcus; that is the first stage in the treatment, namely, to know what microbe you have to deal with. Then we tested the resisting power of her blood to this streptococcus and her resisting power or her opsonic index came out as 0.4; that is to say, that although she had microbes in her blood she was not successfully auto-inoculating herself. We then prepared a vaccine from the streptococcus obtained from her blood and inoculated her with a small dose. Immediately her blood power rose well above normal and the temperature began to come down. Successive inoculations were undertaken over a period of several weeks as indicated by investigation of the opsonic power of her blood, and the result was most gratifying. With the rise of opsonic power came the fall of temperature and amelioration of the patient's symptoms. The final result was that the patient made an absolutely uninterrupted recovery and she is to-day in robust health. (Applause.) That case made a great impression on us because inoculation seemed such a desperate thing to do. In the historical order we had already done something similar in certain cases of Malta fever, which, as you know, is caused by a microbe. You see nothing of it on this side of the water, but the microbe is very commonly distributed through the world; and in India and China and at all the Mediterranean stations there is a great number of patients. Five per cent. of the Malta garrison take Malta fever every year. Nine of us altogether in the laboratory got Malta fever from working with the microbe, therefore we have a very healthy respect for Malta fever. Not that it is dangerous; only one of us died and that was the laboratory man.

The mortality of Malta fever is about two per cent., not a formidable fever in its immediate results, but very formidable from the fact that it sometimes runs on for two years. The average period in hospitals of soldiers is ninety days, but it frequently goes on for a year, and it frequently leaves people with crippled joints. It is a fever that is in fact not very toxic, but nevertheless lasts a very long time. We ascertained that in many of these cases nature made protective substances extremely slowly, and that the fever lasted a very long time. In the case of myself the protective substances could be determined in my blood when it was diluted six thousand times, and I got over my attack very easily. In other patients I have observed the protective substances so small in quantity that they could hardly be measured. In such cases, while there is little danger of the patient dying, there is great danger of the fever continuing a long time. We have inoculated eight or nine cases now, and in every case we have found that the resisting power of the blood was increased as a result of inoculation, and that the temperature soon came down. If any of you get Malta fever, come over and be inoculated.

Where we do not know what to do with a disease, where the microbes insist on living in the body, where, for instance, after a surgical operation the wounds fail to heal, because the microbes continue to multiply themselves, there is still a way out. You can find out the microbe, test the patient's resisting power to this particular microbe, and set to work by appropriate inoculations to increase the resisting power of the patient. I think that you will almost always see enormous clinical improvement. That is one reason why I would like to have discussed with you the physiology of belief; for when I make these statements I don't know whether they come home to you or indeed whether they ought or ought not to come home to you. You should take what I have told you to-night with very great incredulity; you ought to be very critical; you should not say that what I have told you is true; every man should test these things for himeslf. That opens the question as to what ought to be done if work is to continue along these lines here in our midst. Obviously only the fringe of the subject has been touched so far; it requires a great deal of effort to find out all that can be found out about therapeutic inoculation. There are very many diseases yet to be tried. In each case you can see that if you can find the microbe, you can test the patient's resistance, make inoculations and strive for favorable results. Where you have to deal with any bacterial disease I would like your thoughts to go immediately to the question as to whether or not this can be treated by inoculation. I look to the future and expect that the medical profession will be divided somewhat differently. There will be, of course, the general practitioner who will know that arsenic is useful in some cases, that the syphilis microbe is killed by mercury, and so forth. Then it might be possible for all medical students to learn the physiology of immunization; I hope that that will come to be taught. It is not ready to be taught yet, because it is being developed, but it ought to come into the physiology of the future. In the physiology that is to be of every-day practical value what is the most important thing? Not how to digest your meals, but what steps does Nature take to get rid of the microbes that are playing havoc within you; and what happens after microbes are introduced into the body. That physiology of immunization should come to be taught as a matter of course in every medicalcollege. As a natural outcome of such development in medical science a new type of practitioner would appear, namely, the immunizator. He would say, You are infected with a particular microbe and my business is to find out the microbe, make a vaccine from it and inoculate you and bring up the resisting power of your blood. For such skilled service you will require a man who has spent years of study to master the technique; to know how to make the vaccines, to know where to look for the microbes, to know which are the most important microbes, to know how to isolate them, and most of all, a man with sufficient experience and ability to apply all these things.

At present we have no short cuts (with one or two exceptions) that make it possible to treat bacterial disease by inoculation without following closely the changes that take place in the blood of the patient from time to time as a result of inoculation. Whether these short cuts will emerge after much further study of this subject is a matter upon which it is impossible to express an opinion.

ON FIFTY CASES OF INFANTILE PARALYSIS*

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I would first draw attention to the vascular supply of the spinal cord and to some points in the pathology of infantile paralysis. The lesions found in infantile paralysis. The lesions found in infantile paralysis usually lie within the distribution of the anterior spinal artery. Most now look upon the disease as of the nature of an infective process, the noxa generally arriving in the cord by way of its central arterial supply. The lesions in infantile paralysis may be widespread, as may be seen from the diagrams and paintings made from specimens obtained from a case which I published in "Brain," 1895. The child was six years old and died eleven months after the onset of the disease of independent causes.

The fifty cases upon which this lecture is based are unselected. Unfortunately, the details, mostly written down in the hurry of out-patient practice, are sometimes not as full as one would have desired.

In 46 of my cases 19 occurred in boys and 27 in girls—a curious and no doubt chance occurrence, as the disease generally affects boys and girls indiscriminately. In 46 of the cases the disease commenced during the first year of life in 7 cases, between the first and second years in 19, and between the second and third years in 11. There was 1 case between the third and fourth years, 1 between the fourth and fifth, and 5 between the fifth and sixth. One girl was in her fourteenth year when attacked. All the cases in the first year occurred in the second six months, the youngest being six months old. The age incidence will thus be seen to be the usual one, the majority of the cases occurring during the second and third years.

In most of the cases the onset occurred during the warm months of the year. In 2 cases there was a history of a fall, but it was slight, and the injury had apparently nothing to do with the causation of the disease. There are 4 cases in the 50 in which the disease followed upon an acute infective illness, 2 immediately after measles, 1 after typhoid fever, and 1 after acute rheumatism. The last case was an interesting one, in which a girl aged 6 years had a well-marked effusion into the joint, and there was at first some difficulty in diagnosis.

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*Brit. Jl. Chn's Dis.

I will now give briefly the outlines of an ordinary case.

Case 40.—A boy, J. F—, aged 2½ years, who was twelve months old at the time of the onset, in August, 1904, and who has been continuously under observation since. On the Friday he became ill and vomited, and on Sunday the legs were completely paralyzed. Towards the end of November he could creep about a little, the left leg being the worst. At the end of December he could stand with the help of a chair and could bring the left leg (which was the worse of the two) forward at the hip. Thus in a little over four months there had been a very considerable recovery. On March 1st, 1906 (nearly seventeen months after the onset), the following note was made: "The right leg has recovered apparently perfectly. The left leg is smaller than the right. He can walk with the help of the hand. All the muscles about the left ankle are paralyzed, and the foot flail-like. The toes are pointed, and there is slight *pes cavus*. There is no power in the quadriceps extensor, but the ham-string muscles act a little. In the iliopsoas there is some power. The child could not be got to use the sartorius or the abductors of the thigh. The external rotators seemed to have retained some power. Electrical examination was not possible without force."

This case illustrates some of the main features of the disease in its stages of (1) onset, (2) paralysis, (3) amelioration, and (4) residual paralysis, where little or no further improvement is to be expected. The initial stage is mostly accompanied by fever, sometimes vomiting, and rarely by pains. I have no note of convulsions having occurred in any of my cases, and only one, viz. a girl of 7¾ years, was pain complained of. The initial stage does not usually last more than twelve to forty-eight hours. It was noted as prolonged even up to a fortnight in three cases, and in the cases following upon an acute infective illness the symptoms were lost in those of the pre-existing disease.

Sometimes this initial stage is practically absent, and the paralysis is observed the first thing in the morning (the morning paralysis of West). I have records of six such cases in which the mother stated that the child went to bed quite well on the previous evening.

The disease passes into the next stage when the paralysis appears. The onset of the paralysis is usually abrupt, but I have notes of one case where one leg was stated to have been paralyzed the Friday and the other on Sunday.

The paralysis in the first instance is nearly always, as in J. F—, relatively extensive. It may involve all four extremities, as in one of my cases; or both legs, as in fifteen, or one leg only, as in fifteen; or one arm, as in seventeen cases. In two cases it was probably hemiplegic, and in one case it involved the leg and the opposite arm. In nearly all my cases, so far as I have been able to ascertain, where the paralysis was eventually found in one or more groups of muscles alone, there was evidence from the history and examination of the limb that the paralysis was much more widely spread earlier in the disease. This stage of a more or less generalized paralysis lasts at most a few weeks, during which the paralysis, when once it has reached its height, remains stationary. It is during this stage that the muscles begin to waste in the second or third week of the disease, and the electric reactions undergo change. The so-called tendon jerks disappear if the muscles concerned are affected.

An early recovery, which, however, has only remained partial, was noted in one of my cases. This recovery usually sets in from a couple of weeks at the earliest to six to eight weeks. The more widely distributed the paralysis, the more extensive the recovery. Indeed, some have maintained that where exceptionally the initial paralysis is very limited, little recovery ensues. The question has been much debated as to whether complete recovery ever takes place (the so-called temporary paralysis of Keating). At any rate, all are agreed that it is very rare. The following case is included in my series.

Case 33.—A girl suddenly ceased to use her left arm at the age of 10½ months. Three months later the child was found to have a little wasting about the muscles of the shoulder, but there was no dropping of the head of the humerus. No other cause could be found to account for the restricted voluntary movement. No electric examination was possible. I saw the child a week ago, and I could find no trace of the previous illness.

Case 22.—In August, 1903, I saw a young woman whose right arm was smaller than the left, but all the muscles appeared to act equally. The right leg was also a little smaller than the left. There was a history of a sudden onset at the age of 6 months. I thought it was most probably an old infantile paralysis of the hemiplegic form (not infantile hemiplegia), in which recovery had ensued.

By far the most common result is to have only a partial recovery, sometimes small in amount, occasionally even very considerable.

Case 39.—A girl, then aged 1¾ years, became paralyzed during the day in her right leg in October, 1905, so that she was unable to walk at night. When seen in February last she could walk well. There was a very slight wasting of the muscles below the right knee, and a little weakness in the peroneal muscles, with a trifling tendency to talipes varus.

In the case of J. F—, mentioned above, the original paralysis involved both legs, and, as is not very uncommon, one of the legs has recovered completely, whereas the recovery in the other is very partial. The same result was noted in two other cases. In another case with a very partial recovery in the right leg the other foot showed a slight degree of pes cavus.

Case 8.—In another child, aged 2¼ years at the time of onset, and whom I saw four months later, there was a paraplegia, the left leg being the worse of the two. She could then just walk round a chair by holding on to it. Six year later she could walk comfortably but a little awkwardly. There remained quite a noticeable wasting in the muscles of the left leg below the knee, with shortening and a compensatory spinal curvature, and also wasting of the right thigh muscles. I shall refer to this case again under "Residual Paralysis."

In the case of the arm the same more general character of the paralysis, followed by recovery of varying degrees, is observed. It is well illustrated in the following cases:

Case 43.—A girl, aged 11 years, came to the Leeds Infirmary a short time ago with chorea, especially marked on the left side. Some of the small muscles of the hand were found to be wasted and paralyzed. Abduction and opposition of the thumb were impossible. The actions of the interossei and abductor of the little finger were weak. The whole arm itself was found to be distinctly smaller than the other, but all the muscles acted well. All muscles responded readily to the Faradic current with the exception of the small muscles of the hand. A history of an acute attack of paralysis at the age of five years was obtained.

Case 41.—A girl, aged 4 years, now in the Leeds Infirmary with a view to tendon implantation, was seized with paralysis in the left arm two years ago. The whole of the left arm is smaller than the right, but the movements at the shoulder are normal, though weaker than on the opposite side. Flexion and extension at the elbow are efficiently carried out. The extensors of the wrist and proximal phalanges act well and supination is normal. The flexors of the wrist and fingers are almost completely paralyzed and pronation is imperfect. These muscles are wasted and show the reaction of degeneration. Some little power can be made out in flexion of the wrist when the over-extended wrist (due to the weight of the hand) is artificially supported.

A still more extensive paralysis was seen in December, 1899.

Case 9.—A girl, aged 2 years, was suddenly seized with paralysis in the left arm on the second day of the illness. Here the left arm is described as being completely paralyzed at the shoulder, and hyperextension was noted at the metacarpo-phalangeal joints (unopposed action of the extensor communis digitorum). The reaction of degeneration was present in the affected muscles. I have failed to trace this case, but at the time it appeared almost certain that there would be no further recovery.

The above cases illustrate the varying degrees of recovery after the more generalyzed paralysis of the earlier phase of the disease has remitted and the patient has passed through the stage of amelioration or regression.

If the child presents itself in the earlier phases of the disease particularly, it is very important to ascertain to what extent recovery is likely to proceed. The first essential is to make a careful examination to ascertain what muscles are involved. Infantile paralysis, like many other diseases, is quite uninstructive and uninteresting if the diagnosis is to stop short at the mere recognition of the disease.

It is therefore necessary to bear in mind which muscles are specially vulnerable to the disease. The muscles in the front of the whole leg suffer more severely than those at the back of it. The flexors of the foot on the leg, the extensors of the toes and of the big toe, the peroneus longus and tibialis posticus, and the quadriceps extensor are thus more vulnerable than the calf or hamstring muscles. The iliopsoas and often the sartorious retain at least some power. The distal muscles in the leg and the proximal ones in the arm usually bear the brunt of the disease. In the arm the deltoid alone or in combination with the biceps, brachialis anticus, brachio radialis, and perhaps with the supinati and pectoralis major (part) are susceptible to the disease. Next should be placed the extensors of the wrist, and, I think, the small muscles of the thumb.

The power of standing with or without assistance, and of walking, and also the nutrition and reflex activity of the limb, are noted; then the movements at all the joints are carefully tested.

Before it is decided that no power remains in a given group of muscles, the overstretched muscles should be further stretched so as to give them the chance of acting at an advantage, as Tubby and Jones have specially pointed out. I have not much experience of this method, but in one case—as noted above in Case 41—the opposite effect was noticed. In a very young child this examination is obviously by no means easy, but it is of the first importance to know what muscles are involved. If the child is a little older, it is often easy to get it to try to imitate with the affected limb any passive movement impressed on the sound limb. The electrical examination may be, for obvious reasons, also of great difficulty, yet the importance of it in prognosis, and even in diagnosis in a difficult case, can hardly be over-estimated. The latter point was particularly illustrated in Case 50, in which rheumatism had preceded the attack of paralysis. In prognosis it provides invaluable evidence as to the likelihood of recovery, hardly to be obtained in other ways.

The change in the electric reactions occurs as early as the twelfth to the fourteenth day, sometimes later, and the exaggerated galvanic irritability disappears in about two or three months and then steadily decreases, but it is very characteristic of infantile paralysis that intra-muscular galvanic irritability may be demonstrated for a long time in the paralyzed muscles (Bruns and Winscheid). It is said that if there is no reaction to Faradism in two months permanent loss of power more or less complete is to be feared.

In the regressive stage of the disease the muscles in which the electric excitability has become steadily altered are condemned to definitive atrophy. Muscles which present the reaction of degeneration ought to be looked upon, if not as defintely lost, at least as seriously threatened (Déjerine and Thomas).

During the stage of amelioration the paralysis becomes more limited, but unfortunately, as stated above, rarely disappears entirely, so that a residium of paralysis practically always remains, and it is this residual paralysis, and especially its distribution, which I now come to consider.

As is now well known, muscular movements are localized in the spinal cord, those of the limbs in the cervical and lumbar enlargements respectively. Infantile paralysis is a disease of which the stress falls upon certain vascular districts of the spinal cord, and the segmental topography of it usually is obvious. The residual paralysis remains because the corresponding centre is destroyed, and this nervous tissue is so highly specialized that true regeneration or vicarious function is not observed in it. Recovery, partial or otherwise, may occur, as Bruns and Winscheid state, because the motor centres occupy more than one segment, and so foci of poliomyelitis which confine themselves to one segment need not necessarily cause permanent paralysis; this latter condition, however, occurs, unfortunately, very rarely, as the branches of the central artery distribute themselves over numerous segments.

In consequence of the grouping of muscles in the individual segments of the spinal cord there are certain types of the residual paralysis. These are given here chiefly after Starr.

In the arm there is the common upper-arm type, in which the deltoid, supra and infra spinati, biceps, pectoralis, brachio-anticus and brachio-radialis are affected. These muscles are localized in C. iv, v, and vi. There is also the more limited type mentioned by Haushalte, in which the deltoid or even part of it is affected, with or without the biceps, brachialis anticus and brachio-radialis. In the lower arm type the muscles below the elbow are effected—viz. the extensors or flexors of the wrist, the brachio-radialis escaping. In other cases the interossei, thenar, and hypothenar muscles are involved, the long flexors escaping. These muscles are localyzed in C. viii and D. i. In some cases the upper and lower arm types may be combined (as in Case 10) in which instance the whole arm may be more or less useless.

There appeears to be more difference of opinion about the exact localization in the lumbar enlargement, but the association of certain muscles in infantile paralysis in the leg is obvious.

In the lower leg type the peronei alone, or with the anterior tibial group, are commonly affected, although the posterior group may also share in the paralysis or be as fully paralyzed as the others. Sometimes it is said that the tibialis anticus may be alone affected or may alone escape. The anterior tibial group are apparently localized in L. v and S. i, and the peroneal muscles in S. i and ii.

In the upper type the iliopsoas, glutei, and muscles about the thigh are those chiefly affected, the muscles on the inner side escaping. The sartorius is said to escape when the quadriceps extensor is involved and its centre appears to be situated higher up in the lumbar cord along with that of the iliopsoas.

In some of the fifty cases the stress of the disease, as represented by the residual paralysis, has fallen on districts of the cord not exactly contiguous. Thus in six cases there was, in addition to the paralysis about the shoulder, an involvement of the small muscles of the hand. Perhaps the following is the best example of it:

Case 45.—A girl, aged 8 years, was attacked when two and a half years old with infantile paralysis. There is much wasting in the region of the deltoid biceps and triceps. The humerus is displaced downwards and forwards. The forearm is normal. Abduction and opposition of the thumb are lost and these muscles are wasted. Such a distribution would indicate a lesion in C. iv, v, and vi, and also in C. viii and D. i.

The exceptional distribution of the paralysis in lesions involving either lumbar or cervical enlargement may be due to irregular offshoots branching out from the diseased focus or possibly to the size of the motor centre (Bruns and Winscheid). It is quite exceptionally rare to find the residual paralysis symmetrical on the two sides.

One of the worst results of infantile paralysis is the deformity which it so ofen gives rise to. This deformtiy may be due to the unopposed action of the so-called antagonist, often synergistic, muscles, or it may be due to static causes in Volkmann's sense of the word, such as weight of the limb, etc., or to actual structural change in the muscles. The deformities are much more frequent about the foot than elsewhere, and they are nearly all readily explained. In the knee there may be genu recurvatum, as in Case 40, or contracture in the unopposed hamstring muscles, as in two of my cases. In the upper extremities deformities are less frequent. The dropping of the head of the humerus owing to the weight of the limb was present in nearly all my cases of the upper arm type, and in two of these it was also drawn somewhat inwards by the pectoralis or subscapularis. In the elbow and hand contractures do not often occur. The flexors may overact in extensor paralysis, or less often the extensors owing to paralysis of the flexors. Deformities do not, as a rule, occur within the first two months, and usually later, but cases have very exceptionally been noted a month after the onset of the disease.

Such deformities, as a rule, tend to increase as the child grows older. Thus no great difference may be noted at first between the two sides, but after a year or two it becomes very manifest. The younger the child at the time of onset the worse is the deformity likely to be.

In the first days of the disease the diagnosis may be impossible, especially before the onset of the paralysis. In a fat child the difficulty may exist even later. Joint and bone affections may possibly at times give rise to much difficulty in diagnosis. Where it is possible the electric examination may be of great help. Peripheral obstetrical paralysis may lead to difficulties in diagnosis. The history is of material assistance as infantile paralysis is rare in the first six months of life. I have notes of a certain number of cases of obstetrical paralysis, but I have not as yet met with any serious difficulty in its recognition.

I need add very little in regard to prognosis. I have never seen a fatal case (Case 1 died of independent causes). Complete recovery is, as has been stated, of the greatest rarity. Partial recovery is the rule. The question of the recovery of the individual muscles has been already mentioned under "The Electrical Examination."

Not a few cases have been recorded where a progressive muscular atrophy has followed upon an infantile paralysis. In one of my cases (No. 45), quoted above, the mother persists in telling me that the muscles of the other arm (which are smaller than they should be) are following in the same way as those of the other limb, which is the seat of old infantile paralysis.

I shall content myself with mentioning only a few points in connection with the management of infantile paralysis. Probably a too active treatment in the early stage of the disease is not desirable (counter-irritation, ice-bags). Warm packs, as suggested by Oppenheim, may be useful. Warm baths have been suggesed if stupor is present. Hot diuretic drinks may be given with the view of promoting the elimination of the poison, later systematic massage; active and passive gymnastic exercises are useful. Following Starr's suggestion, I recommend these parents to let the child kick about in a warm bath once or twice in the day. Galvanism may be used, but it should not frighten the child, and not too much should be expected of it; after a year it is doubtful whether much benefit will be derived from it (Stintzing).

It is unquestionably a most important matter to guard as much as possible against the development of deformities. Prolonged rest in bed has been suggested with this object. The weight of the bedclothes must not be allowed to contribute to the dropping of the feet. Malleable splints or other device should provide the necessary support which is wanting. The over-stretching of paralyzed muscles must be carefully guarded against, as such a position cannot favor the recovery of power, as Tubby and Jones point out. In paralysis of the upper arm type the arm should be carried in a sling to prevent the dropping of the humerus. In some cases of infantile paralysis which had been seen several years ago it was distressing to see the amount of deformity which had developed since they had passed from under observation.

Orthopedic treatment is of course necessary in these deformities, the division of tendons, muscle implantation, arthrodesis, and also mechanical contrivances.

I have no special experience of tendon implantation. It certainly has not been extensively used with us in Leeds, and I have heard nobody speak with much enthusiasm about it. It appears to me that there are reasons which would not contribute to its successful use in some cases at least. Everything must of course be tried to counteract the distressing deformities, if it only offers the least reasonable chance of success, but too great optimism is to be avoided.

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CONGENITAL COXA VARA*

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E. S., 3-year-old girl, a patient of Dr. O. T. Maynard's of Elyria, was referred to Dr. E. F. Cushing, who kindly referred her to me Oct. 10, 1905.

History.—The family history showed nothing of importance. The mother was well developed and healthy and had several other normal children. Pregnancy was normal. The birth ran smoothly, but at delivery Dr. Maynard noticed that the legs were in a peculiar position. The right one was flexed with the knee pointing outward in the normal way and the lower leg placed across the abdomen, but the left leg, instead of being in a position symmetrical to the right, had its thigh adducted into approximation with the right thigh. The knee was sharply flexed and the lower leg ran parallel to the lower leg of the right side, the foot being turned outward at the ankle. This position having been noted, the doctor drew the legs down and noticed an extreme flexibility at the left hip joint, suggesting congenital dislocation. No ophthalmia was noticed.

After this the child was kept under careful observation, and developed and nursed well, the hip not getting any worse, and treatment was deferred to a later period.

On walking, at about 18 months, the child limped on her left leg, the limp not being very extreme, but noticeable. There never was any sign of inflammation, no abscess, no stiffness, no night cries, no history of injury.

Eximination.—The examination showed a well-developed and nourished child, very active, but limping slightly on her left leg. The examination of her shoulders, spine and other joints showed nothing. There was no glandular enlargement, no rosary, no enlarged epiphyses and no other signs of rickets. The examination of the right leg showed nothing. In the left leg the patella was situated higher than in the right.

In the left hip the trochanter was prominent and elevated, being well above Nélaton's line. Motions were not limited except to a moderate degree in abduction and external rotation. On manipulation the head of the bone could not be located out of its socket, but there seemed to be a peculiarity about the joint compared to that of the other side, as though the neck had lost its normal angle with the shaft. The left knee was somewhat knocked. There was some pronation at the ankles. Besides this there were no defects nor deformities. Measurements from the great trochanter to the knee joint showed the shafts to be about equal. Measurements of the leg were as follows: A. S. S. to I. M., right 16, left 15½; umbilicus to I. M., right 18¼, left 17¾; circumference right thigh 10½, left 10½; circumference right calf 7¼, left 7¼.

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*Jl. A. M. A.

Thus there was no atrophy and only one-half inch shortening, apparantly due to something wrong about the hip joint. A Roentgen picture was taken which explained the condition. On this the neck of the bone is seen to be shortened and thickened and placed at a right angle to the shaft. The epiphysis is only one-fourth the size of that of the other side. The acetabulum is exactly like that on the right. The pelvis shows nothing wrong and the femoral shaft is not atrophied. The apparent thickening is probably due to the fact that the two legs presented a slightly different angle to the tube. The thigh is in a position of slight adduction.

The evidence in this case is, we believe, sufficient to prove its being congenital. The peculiar position of the thigh, that is, the extreme adduction, and the extreme flexibility noticed right after birth, point to its intra-uterine origin.

REVIEW OF LITERATURE.

Kredel[1] was the first to call attention to the possibility of the congenital occurrence of this deformity. He reported two cases. The first case, seen at three years, was a double coxa vara with other congenital deformities of the limbs, namely genu valgum and pes equino-varus. The second case was unilateral coxa vara, genu valgum and pes equino-varus of the same leg, together with absence of the patella, severe genu valgum and pes equino-varus of the other limb. The legs in these two cases lay parallel and adjoining and directed toward the left so that they formed an angle with the trunk of 135 degrees. The left or normal hip was abducted and the right or deformed hip was adducted. He states: "When one has seen this well-nourished and active child taking this position repeatedly, then one cannot doubt the fact that both the legs had been constrained and had grown in this position in utero for a long period."

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[1] Kredel: Centralblatt f. Chir., 1896, No. 42.

The next report on this subject is by Zehnder,[2] who reports a double case in which the birth was normal and in which the child walked at the age of one year, but waddled at the very start. There were no other defects or deformities described. The same year Kirmisson,[3] writing on this subject, reported the case of a child nine years old with rachitic deformities. The femoral diaphyses had enormous curves convex anteriorly and exteriorly. These curves were continued into the neck of the bone, producing coxa vara. He also reports two autopsies on rachitic infants shortly after birth, in which the deformities were the same as in his first case.

The next report is by Mouchet and Aubion.[4]. They report two cases. The first case was double, with unimportant history and no rickets. Both legs had a total concave bend inward. The second case was single, also without rickets. The authors further call attention to a radiograph of a hip of a child, which they believe to have been an intrauterine fracture of the neck, founding their belief on the radiograph. This lesion resembled the first two cases and suggested such a fracture as being possible, especially as postuterine fracture could be eliminated in both.

The next report is by Joachimstahl,[5] who believes that in two cases which he reports he had a type of coxa vara which has clinical relationship with those occuring in the earliest period of extrauterine life, but he calls attention to a less typical form of congenital coxa vara which has a relation to congenital defect of the femur. He reports a case in which a severe coxa vara occurred on the right side, with a defect of the upper part of the shaft, and an extreme coxa vara on the left. The author calls attention to a case which Drehmann reported, and reports one which is parallel, the two cases showing similar combinations. He calls attention to the fact that besides the defect in the femur and the bend at the upper end of the stump, there occurred a decided retardation of the ossification of the upper part.

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[2] Zehnder. Centralblatt f. Chir., 1897, No. 9.
[3] Kirmisson. Revue d'Orthopedie, 1897.
[4] Mouchet et Aubion. Gazette hebd. de med. et de Chir., 1899.
[5] Joachimstahl. Zeitschrift f. Orth. Chir., Vol. xii, Nos. 1 and 2.

Parallel with Joachimstahl's report we find the report of Reiner[6] on the relationship between congenital coxa vara and congenital femur defects. He believes that congenital coxa vara is a preceding stage in a deformation process leading to the defect of the femur. He says that there are three types of this condition, each of which represents a different stage in the same process. In the first type, or the first stage, we have congenital coxa vara. At the same time the shaft is shortened both in length and caliber. The other two stages are represented by greater defects in the femur, even by total absence, but he emphasizes the fact that each one of the three types is a fixed stage of one and the same deformation process.

The process is referred to as a "modellirendes trauma" beginning in the amnion. What influences the formation of the deformity is the peculiar course of development through which the femoral shaft passes in its earliest period of embryonic life. At about the tenth week the proximal end of the femur is subject to a transformation process in which the thigh, which is normally abducted in relation to the pelvis, instead of this is now adducted and turned inward, while at the same time the formation of the angle of the neck of the shaft takes place.

Recently Clark[7] reported a case of congenital coxa vara with associated deformities in a girl two years old, in which the Roentgen picture showed on the left side a typical coxa vara. The other deformities were a bend at the left knee joint of 45 degrees, with absence of the patella and the quadriceps. The foot was in a position of talipes equino-varus. On the right side there was genu recurvatum and talipes calcaneo-valgus. Besides this the radiograph showed the sacrum deflected to the deformed left side and that the upper side of the os innominatum was flattened.

Before concluding this review it is necessary to refer to the conditions described by Drehmann[8] with reference to joint inflammation in sucklings and their etiologic relation to later deformities. He says that in the earliest age we may have a typical joint inflammation, beginning with local signs, followed by healing and later by deformity. He points out the relation of this condition to an infection such as the gonococcus, but not necessarily this organism. He says that a slight trauma during delivery would predispose toward auto-infection. Among these cases he says there are some so-called congenital dislocations and rarely a coxa vara. He reports two of the latter, one of them typical. The point is that such deformity, according to the author, can not be distinguished from the so-called congenital ones.

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[6] Reiner. Zeitschrift f. Orth. Chir., Vol. xii., Nos. 1 and 2.

[7] J. Jackson Clark. British Journal of Children's Diseases, June, 1904.

[8] Drehmann. Zeitschrift f. Orth. Chir., Vol. xiii., Nos. 2 and 3, Vol. xiv., Nos. 3 and 4.

DISCUSSION OF CASE.

This review, we believe, covers all the important works on congenital coxa vara up-to-date. The relation of my case to those reported is of some interest. With regard to Drehmann's deformities at the suckling age, I do not believe that mine comes under that category, for there was no history of ophthalmia and no local signs pointing to inflammation.

The rachitic deformities in a few of the cases have nothing to do with mine, as there were no signs of rickets. The question of associated deformities or defects which occurred in so many is an interesting one, because the only other deformity in my case was that of a knock-knee. According to Reiner's belief that coxa vara is one stage in a process leading to femur defects, this case would readily find its place in his classification were it not for his observation that the shaft is shortened both in length and caliber even in the first stage. My case does not answer to this description.

As to the theoretical origin of the deformity *in utero* we believe that the mechanical conditions are sufficient to explain that. Reiner's theory that at the end of the tenth week the angle of the neck of the shaft is determined by intrauterine conditions seems reasonable as an explanation which is founded on the fact that the femur, instead of being abducted, is adducted. In this connection it seems worth while to place a fetus in the position which my case seemed to have had at birth.[9]

Taking an eight months' fetus, hardened in formalin, we placed the right leg in its normal position as it occurred at birth, that is, flexed and abducted and then forcibly adducted the left leg on the belly so as to adjoin the other one. Tying the thighs in this position, we took a Roentgen picture of the fetus (Fig. 2). The picture shows a different relationship of the proximal ends of the femur to the acetabulum on the two sides. On the right, or normal side, the proximal end lies in a horizontal plane with the lower extremity of the pelvis. On the left, or adducted side, we find the end of the shaft well above the acetabulum in height. Besides this the pelvis it tilted upward on the left and the sacrum deviated toward the same side. This deviation of the sacrum toward the deformed hip is an important point, for an exactly similar deviation is shown in Clark's radiograph. This means that we have probably demonstrated correctly the mechanical nature of the intrauterine strain.

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[9] For suggestion on this point I am indebted to Dr. O. T. Maynard.

If my case took the position of this fetus in the uterus we have a right to assume that the relationship must have become fixed and maintained for a long period but without interfering with the freedom of motion of the joint. Then, after birth, the joints' ends must still further have maintained their relation to the pelvis, the left end remaining higher than the right, even after both legs have been brought downward into their extrauterine positions. This hypothesis is favored by the fact that ossification in the neck takes place from the shaft and travels upward toward the head which ossifies in the acetabulum from a separate centre during the first year.

An interesting feature in my case is a diminution in size of the epiphysis of the head. On Clark's radiograph an epiphysis is not recognizable. The explanation of this is either the faulty static conditions of weight bearing, or retarded growth, due to a lesion of the neck. The shortening of the neck, together with thickening, suggests an intrauterine fracture, but we are not able to conceive a fracture in the true sense where the bone has not yet been formed.

CONCLUSIONS.

Congenital coxa vara is usually associated with defects or deformities of other parts, commonly with the defect of the femur and with deformities of the lower limbs. It may be intrauterine in its strictest sense, it may be the result of an intrauterine infection, or it may be combined with congenital rachitic deformities. At least some of the strictly intrauterine cases are associated with peculiar positions of the thighs in utero, that is, adduction of the thigh in question. This peculiar position of the joint might explain a fixed deformity in the later developing hip joint, if we may assume that the proximal end retains its relative position to the acetabulum after birth.

ACUTE BONE DISEASE IN CHILDREN*

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Acute inflammation of bone in children—the disease which I have chosen for the subject of my paper to-day—is full of interest and importance, and though it is by no means a rare disease, still it often happens that when one is called to a case of the sort, he is apt to be off his guard, and, somehow or other, it comes about that the diagnosis is not seldom made only after loss of valuable time or is missed altogether. I can quite understand how, in hospital practice, error in diagnosis may arise.—The case is purely surgical; the house-physician sees it, and mistakes it into a medical ward, and, if the physician happens to be pressed for time, he may accept the house-physician's diagnosis. It is all very simple; and the moral is: "Always make your own diagnosis in every case, for even house-physicians are but human."

I dare say that the surgeon, on his side, makes mistakes now and then, treating a medical case as surgical, but surely that would be a point for some other than myself to take up.

I will begin by giving a short account of the development of a long bone, and will take the femur at the age of 8 or 10 years. It consists of a diaphysis of fairly solid bone, and of two extremities which, though also of bone, are separated from the diaphysis by an intervening layer of cartilage. This layer of cartilage keeps on growing; and, as it grows, the surface next to the diaphysis is steadily converted into new bone. Thus, the increase in length of a long bone is effected by deposits of new osseous tissue at the end of the diaphysis, and this is continued until, in due course, the epiphysis ossifies on to the shaft, when growth is complete.

As a general rule the epiphysis become ossified on to the shaft either at puberty or at manhood, and, obviously, the bone grows more at what I will call the "manhood end" of the diaphysis than at the "puberty end," because it has a longer time for the purpose. The knee ends of the femur and of the tibia are their manhood ends, but it is the reverse in the upper extremity, the shoulder end of the humerus and the wrist end of the radius and ulna being chiefly concerned in the elongation of the skeleton of the arm.

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*Brit. Med. Jl.

The new bone at the growing end consists of tissue of great physiological delicacy, and is, therefore, the more likely to be the seat of traumatic inflammation, and disease generally, than is any other part of the bone. Indeed, every disease to which osseous tissue is heir loves this delicate material; syphilis, tubercle, sarcoma, all attack it when they have the chance.

If anything occurs to interfere with the perfect nutrition of this young bone-tissue, disease is all the more likely to attack it; and this remark applies to the bones generally. Thus an injury to the back is the precursor of spinal caries; a strain of the upper end of the femur is the starting-point of hip-joint disease; a kick on the tibia is the obvious cause of sarcoma, and so on. Given certain predisposing conditions, and serious disease may be the sequel of a trivial hurt. Injury to a tissue is always succeeded by an inflammation which lowers the vitality of the part, and micro-organisms have a cowardly habit of attacking tissue of lowered vitality. There are many experiments bearing on this. Thus: Pus has been taken from a subperiosteal abscess in a child, and a particle of it has been introduced on a needle-point into a tube of gelatine. From the colony of staphylococci thus produced a thrust-cultivation has been made in another tube of gelatine—and so on, from generation to generation, through a course of weeks or even of months. Then some of the last-made cultivation has been introduced by a clean injection-syringe into the healthy tissues of one of the lower animals, with the result that an abscess has formed at the seat of the inoculation, no further harm being generally effected. But if, before making the injection, a bone of the animal had been prepared by injury, the injected staplylococci made straight for the damaged spot, and there, undergoing cultivation, set up an acute septic inflammation after their own kind. Cultivations of the same germs could even be obtained from the blood of the animal, and after its death secondary (pyaemic) abscesses were detected scattered throughout the body. There can be no doubt about the virulence of the staphylococci, and of the part which they play in acute osteomyelitis.

GRAVE ERRORS IN DIAGNOSIS.

In a paper which the late Dr. Bristowe read before the Patholigical Society of London in May, 1862, upon the affection in question, he spoke of its acuteness, its danger, and its obscurity, and he said that the disease was not only "deadly," but "common." In confirmation of these statements, he said that he had met with 7 cases of it in the *post-mortem* work of four years, and that five of the patients had died speedily of pyemia. Three of the cases had been mistaken in the wards for rheumatism, and he called attention to the fact that when the pyemic condition was associated with pericarditis it was particularly easy for the practitioner to fall into error in the matter of diagnosis. He also remarked that some of the symptoms bore "a superficial resemblance to those of typhus, typhoid, or even of delirium tremens."

Another disease for which the condition is sometimes mistaken is erysipelas. This is most likely to occur when the affected bone is near the skin—such as the tibia or the lower end of the radius or ulna. Thus, when the upper or the lower end of the tibial diaphysis is the seat of the acute infection, the adjacent skin becomes flushed and hot, and the redness spreading down or up the leg, as the case may be, a casual diagnostician would be very apt to mistake its nature. Even when the affected bone is not superficial there may be redness, heat, and edema of the skin, just as in the case of an acute septic inflammation about the fang of a tooth the cheek may be flushed and swollen; and I take it that the redness of the skin in neither case is due to the presence in it of septic micro-organisms. It is sympathetic.

To avoid mistaking the redness of the skin which is due to subjacent septic ostitis for that of erysipelas, the surgeon should gently press his finger upon the bone. Deep-seated tenderness is characteristic of disease of the bone, but it is absent from erysipelas, which, as its name implies, is only a surface disease —at any rate, to begin with.

I remember an article appearing many years ago from the pen of the late Mr. John Wood, in which he was arguing against the germ theory of disease, and one point of which he made a good deal was this, that some of the most septic cases which the surgeon met—cases which often ended in pyemia—were those of necrosis unassociated with any breach of the surface. He apparently had not realized the fact that the septic germs might reach the bone through the blood stream as easily as they could through a direct wound. And such, we all know now, is the case.

It is likely that there are periods in the life of every child when his blood is infected with septic micro-organisms, which have found entrance into it through the mucous membrane of the respiratory or alimentary tract or through the skin; and if it were not that the vascular streets and alleys are efficiently policed by the colorless corpuscles, the mortality from septic disease would in consequence be extremely high. But even as it is, acute ostitis, pyemia, and death are very often met with at any age up to the time when the last lingering epiphysis is ossified on to its shaft.

Two of the last epiphyses to join on are the knee-ends of the femur and tibia, and as their respective diaphyses are very large and are much exposed to injury by falls, kicks, blows, or strains, there is a double reason why septic ostitis is so often found in the neighbourhood of the knee, and I propose to-day to deal with septic osteomyelitis affecting the knee end of the fermoral diaphysis.

Some few years ago Mr. Crowle and Mr. Kellock, who were respectively the Surgical Registrars of St. Mary's Hospital and of the Children's Hospital, very kindly prepared some tables for me showing the relative frequency with which various bones were affected by acute septic inflammation. Mr. Crowle's cases were taken from over a period of fourteen years, ending 1894, while Mr. Kellock's researches extended back for ten years. Altogether 165 cases were accounted for, boys being more often affected than girls in the proportion of five to three. Of these 165 cases the femur was the bone attacked in 83 instances, the tibia in 47, and the humerus in 20. Next in order came fibula, radius, ulna, clavicle and calcaneum.

Thus, out of the 165 cases the femur and the tibia were implicated no less than 130 times, these bones, of course, being the most exposed to injury. I have, therefore, good grounds for choosing a boy for the subject of my illustrative case, for letting the affected bone be in the lower extremity, and for naming the femur as that bone. Then, I take the lower end of the diaphysis as the affected region because of its being most commonly involved, and because of its being close against the knee-joint which is so often implicated in acute rheumatism.

CLINICAL FEATURES.

In order to illustrate this address, I might blindfold have dipped my hand into the clinical treasury and have taken from it the first report of a case of septic osteomyelitis that it encountered. Then I might have commented upon it as I read it through, for one case is very much like another; but this method might, perhaps, have proved somewhat wearying. Indeed, there are few things more tedious for any one of us than the perusal of a full and detailed clinical record. Yet, when a surgeon forwards an account of his most successful case to the journals (he rarely reports the unusuccessful ones, by the by), with the daily record of the state of the pulse and of the temperature, of the tongue and of the bowels, of the medicines prescribed and the food taken, how wearying and unreadable the stuff becomes! And yet this sort of writing is generally supposed to be the basis on which the superstructure of medical knowledge must be erected. At any rate, there is usually an abundance of it to be found in the medical journals.

I will take the case of a boy, who having put on his skates for the first time, falls and hurts the lower end of his femur—not very severely, however, for he goes on with his awkward attempts, and some hours later he limps home. Next morning he seems quite right, and in a week's time he has, perhaps, forgotten all about the accident. But a few days later he complains to his mother about his *knee* being painful. His mother, seeing that he is evidently in pain, looks at his limb, and detects the presence of several of the cardinal signs of inflammation for the skin is flushed, puffy, and hot, and the boy dreads the limb being touched. What more natural than that she should think that the boy has *rheumatism?* at any rate, that is her "diagnosis." It is a simple and comprehensive term, and we ourselves have sometimes sought its hospitable shelter when driven before the winds of nosological uncertainty.

The mother sends an urgent message to the doctor, saying that the boy has rheumatism in his knee and is very ill. On his way there the doctor says to himself, "Acute rheumatic arthritis; so I shall find the knee hot and swollen, and the boy's temperature will be up."

It all turns out in accordance with his soliloguy. The boy's face is flushed and he looks ill—unusually ill, perhaps, for a case of rheumatism—the knee is swollen and hot, and the thermometer registers 103° in the armpit. Forthwith he prescribes a mixture containing salicylic acid, and he has the tender knee wrapped in cotton-wool. And inasmuch as he has written a specific he feels safe in promising that the boy shall have a better night and be free from pain in the morning.

But when he pays his after-breakfast visit he finds the boy much worse in every respect, and he is told, somewhat reproachfully perhaps, that not only has he not slept at all, but he has been "wandering" all night.

Therefore the dose of salicylic acid is increased, and fomentations are applied to the knee; but the boy becomes acutely delirious, septic endocarditis supervenes, and he dies with the disease unrecognized. The death certificate reads thus: "Acute rheumatism, three days; endocarditis, one day." And everybody has to be satisfied. As a matter of fact, the boy died of acute septic poisoning from the end of his femoral diaphysis, the endocarditis being a manifestation of pyemia, and clearly it ought not to have been regarded as confirmatory of the correctness of the diagnosis of acute rheumatism.

DIFFERENTIAL DIAGNOSIS.

In all probability, though there is a good deal of swelling at the knee, there is no actual effusion into the joint itself, and a second glance shows that the superficial signs of inflammation are, for the most part, in the lower third of the thigh rather than in the area of the articular synovial membrane. Then all that one has to do is to gently squeeze the lower end of the femoral diaphysis between the thumb and finger, grasping it just above the condyles, when, whether the boy is clear-headed, or delirious, or comatose under the influence of a potent animal toxin, he is sure to scream out. He does not object, however, if the knee-joint itself is carefully compressed. The surgeon then grasps the lower end of the shaft of the other femur, and he at once realizes the fact of there being a great central thickening in the tender thigh.

Thus although he has noticed some of the cardinal signs of inflammation on the surface, he finds that two of them obviously exist in the core of the limb—swelling and pain. And to what can this central swelling and tenderness be due if not to the affection of the bone? But the femur itself is not swollen—solid bone cannot swell so readily as that—the swelling is in the delicate tissue at the end of the diaphysis, in and under the periosteum of the neighboring piece of the diaphysis, and in the muscular and connective tissue around the bone.

As a result of the development of these micrococci in one focus, it may be, or in several foci, a virulent toxin is set free which, being taken into the blood stream, may kill the boy outright, and as already suggested, before the practitioner has had time to make his diagnosis. But if the dose is not so strong as that, at least its effects are severe. A small dose of a strong toxin, or a not too large dose of a weaker one (for all toxins are not of equal strength) may simply irritate the grey nerve-tissue, causing headaches, loss of appetite, elevation of temperature, vasomotor paralyses with flushed face, sweating and diarrhea—or the reverse, as shown by the pale, pinched face. Sleeplessness, too, is a direct result of the absorption of a small dose of the toxin. If the dose is larger there may be shiverings, convulsions, vomiting and delirium. *Delirum, indeed is one of the most characteristic features of the disease, and it gives evidence of very serious intoxication.* At this period of the clinical history of an individual he would, perhaps, be too ill to call attention to the existence of an unusually tender area of bone, or if he did complain, and the affected tissue happened to be so thickly covered with muscles as to be not easily accessible for examination (as at the upper end of the femur or humerus, or at the popliteal aspect of a knee-ephipysis), or if, in short, the medical attendant did not know what to look for, it is quite likely that the disease might be taken, as Bristowe says it has been for delirium tremens. This mistake could not be made of course, in the case of a boy or girl; but it might well happen in the case of a young fellow who has just returned from foreign parts, and with his manhood epiphyses not yet ossified on to the shafts, had been entertained by stupid but well-meaning friends in the way which was customary with soldiers even before the times of Michael Cassio and Iago. Supposing that in these circumstances the end of a diaphysis became acutely affected and that the young fellow died, what wonder if the constitutional excitement caused by the disease were ascribed to delirium tremens? Acute osteo-myelitis is a well-recognized affection in young French soldiers who have been overtired and whose diaphyses have been rendered vulnerable by long marching. Lastly, if the strength or the amount of the dose of toxin is unusually great, the patient lies comatose and may die as if from compression of the brain or from accidental or intentional poisoning.

TREATMENT.

In the case under consideration the best thing would be to send the boy into hospital, for the surroundings are probably not suited for the treatment of the case at home, nor is it advisable that his doctor should burden himself with all the anxiety and the lengthy responsibility which the treatment of the case at home would demand subsequent to the inevitable operation. At any rate this boy with osteomyelitis is to be sent into the hospital, and as a surgical patient, let us hope. As soon as he is admitted the surgeon is summoned, and pending his arrival, the limb is cleansed, and, as far as possible, rendered aseptic. By this time the boy is taken into the theatre, and the surgeon, discretely examining whilst chloroform is being administered, and finding no trace of fluctuation, rightly determines to make an exploratory incision down on to the bone. There is one spot where he can easily reach the lower end of the femoral diphysis, and that is on the outer side in the furrow between the ilio-tibial band and the tendon of the biceps. Working deeply in that situation he may discover a tense subperiosteal abscess which communicates with the interior of the bone by a small aperture. Then he opens up the medullary cavity of the femur, enlarging his incision and cutting away the shell of compact bone. He then washes out the cavity with a mercuric solution, and, gently packing it with gauze, applies the dressing, and secures the limb on a splint. It is necessary to apply a splint in all these cases, and to handle the limb with care, for the lower end of the femoral diaphysis is now a mere shell of bone, which may be broken through by a rough or sudden movement of the leg. If all goes well, the boy at once loses his bad symptoms, and the wound gradually fills up with granulations. Unfortunately, however, the cases of septic osteo-myelitis rarely do as well as this; sometimes they do badly, perhaps because the treatment has not been as prompt and thorough as it might have been, but in no instance can the surgeon fortell the exact course which the disease will take. So many of these patients die sooner or later of pyemia, the lungs or the heart being fatally attacked.

Urgent Need of Operation.

If there was delay in making the exploratory incision, the micro-organisms, left in undisturbed possession of the warm moist and oxygenated field, underwent rapid multiplication, anc set up a vascular trombosis which determined a co-extensive necrosis. At the same time pieces of the septic thrombi became detached, and were carried along in the blood stream. These septic emboli have certain favorite resting places, foremost among which are the growing ends of other diaphyses, and at each selected spot the same things occur: energetic cultivation, thrombosis, and necrosis. I remember the case of a boy in whom my house-surgeon and I operated one morning for necrosis of about six diaphyses, and so characteristic a feature is the attacking of several diaphyses, that the term "multiple necrosis" has often been applied to the disease. It is a misnomer, however, for necrosis is the *result* of a disease and not a disease itself. The occurrence of multiple necrosis is, of course, indisputable evidence of the patient having become pyemic. Other favorite breeding grounds are the serous membranes, so that in one case the osteo-myelitis is associated with pericarditis or endocarditis, in another with pleurisy and empyema, and in another with abscess in a synovial bursa or joint; or the secondary inflammation may occur in the lung or in some distant area of loose connective tissue, such as the arm-pit.

But if, in cutting upon the bone, the surgeon finds no abscess, he must not close the wound and reproach himself with having made a mistake or with having been too precipitate. On the contrary, he is to continue with his exploration by searching with a director around the femur, exploring even in the region of the popliteal artery; where, under the periosteum of that triangular piece of bone above the condyles, pus is very apt to lurk. Still having found no pus, he is to drill a hole into the lower end of the diaphysis, and, as it were, to make it his business to find some pus. The prospector in search of gold does not satisfy himself with a single boring, he does not give up until he has made a most thorough exploration in every direction, and the surgeon who is instituting a search far more important than that of the prospector must not content himself with less thoroughness. He may have to explore to the interior of the bone in more places than one, thrusting a grooved director into the various bore-holes, so that if there is pus he may be certain to strike it. And then, having found it, he must open up the bone freely, as already described, scraping out and irrigating the sceptic cavity. But if, after the most thorough and serious operation, no pus is discoverable, what is to be said to the parents? Is the operator to say that he has erred in diagnosis or treatment, or even in both? Certainly not! He must say (which is sober truth) that in all probability his operation may be the means of actually preventing abscess and necrosis.

It is imperative to be early at such an operation, for the longer that the tension in the bone is allowed to remain unrelieved, the more serious and widespread will be the trombosis and necrosis. It is highly expedient, to open the bone before abscess has formed; this is the only way in which the local and constitutional effects can possibly be averted. The position which the surgeon should take concerning the question of the existence of abscess preparatory to the operation is this, that if he waits until he is "cock-sure" that abscess has formed, the damage which he is so anxious to prevent has been already done, and that promptness is everything. To cut onto or into the lower end of the femur at a time so early that the surgeon cannot be sure of finding pus, needs a considerable amount of courage on the part of the surgeon and of trust on the part of the parents. The operation must not on any account be postponed until the surgeon is absolutely certain that he is going to find pus.

But supposing the surgeon has cut into the bone, and, though possessing the enterprise of a gold-prospector, has discovered no pus, he has done no harm, and he may insert a small drainage-tube, and then dress the wound in the happy consciousness of the fact that he has done his duty. And it is not unlikely that next day, or the day after, he may have to open up the wound to allow of the escape of a quantity of septic matter which, though not discoverable at the time, is now demanding free exit, the operation having prepared the way for the abundant demonstration of the existence of an abscess in or about the bone.

In a large proportion of cases of acute osteo-myelitis of the lower end of the femoral diaphysis, amputation has sooner or later to be resorted to. Thus, it may be required early in the course of the disease within a few days of the surgeon cutting into the bone, because of the great increase of local symptoms, and because of the violent constitutional disturbance which the septic focus is setting up. Sometimes amputation is performed because of extension of the disease into the knee-joint, or, still later in the progress of the case, it may be resorted to as a sort of compromise, and to save the child from falling a victim to pyemia or to exhaustion dependent on long-continued discharge.

At the time of the amputation it is well to examine the sawn surface of the femur, and if necessary to scrape out the core of septic marrow, or to remove the tapering central sequestrum.

It is only of comparatively recent years that the nature of these cases has been clearly understood. They were formerly regarded as acute inflammatory affections of the periosteum, and amongst the names given to the disease were "erysipelas of the periosteum," "phlegmonous periostitis," and "subperiosteal abscess." Our reasons for now affirming that the disease is primarily an affection of the young bone and marrow are:

1. That when we are early and bold in our treatment we may catch the disease beginnig as a small, acute abscess in the crevice between the diaphysis and the junction-cartilage, the epriosteum being still closely adherent to the bone, and scarcely at all affected.

2. That when the disease is allowed to run its course, and does not happen to be associated with so much suppuration that the periosteum is detached far and wide, and the bone killed outright, the inflammation may be found extending centrally up the shaft, gradually inclining away from the compact shell, and confining itself more and more to the marrow and the central, cancellous bone.

3. That when necrosis occurs it is central rather than peripheral—sure evidence that it is caused by imflammation in the bone itself rather than by that of the periosteum.

4. And lastly, that during the time that the sequestrum is becoming separated, the periosteum is forming in its depths a sheath of new bone which is eventually to take the place of the piece which is to come away as a sequestrum. Had the periosteum been primarily affected by the devastating inflammation, it is certain that it could not have so promptly and successfully set about the formation of the involucrum.

PYEMIC COMPLICATIONS.

It is quite a common thing in this disease for a joint, or for several joints, to be seriously involved. If it be a distant joint that is attacked the cause is evidently septic infection, or, as we used to call it, pyemia. But not infrequently the disease extends directly into that joint in the close proximity of which it started. There are several ways in which the septic process may thus involve the joint, the first being by the articular lamellæ of the bone and cartilage of the epiphysis being traversed by the ulcerative process. Another way in which the micro-organisms may enter is beneath the periosteum and the attachments of the ligaments, and a third route is by traversing the synovial membrane anywhere between the periosteum and the skin. As a rule, when the joint becomes involved severe constitutional disturbance is at once manifested, whilst the articular synovial membrane becomes distended and acutely tender, and the presence of intra-articular abscess is declared. The complication is, of course, an extremely serious one, but the general and local disturbance is not usually so great as it would be if the case had been one of primary suppuration in the joint, the reason being, I apprehend, that the daily and long-continued absorption of doses of the toxins has already rendered the patient somewhat tolerant of the presence of the septic micro-organisms. A good many years ago a friend of mine in the Indian Medical Service told me that he had once been called upon to investigate an outbreak of cholera in some coasting vessel near Calcutta, and on going into the question of the drinking water, he found that the ship's tanks had been filled up with supplies from a source which had been defiled by the native villagers in every conceivable way. Nevertheless, the natives were themselves drinking the polluted water with impunity. Everything in the matter of toleration depends, as the saying goes, on what one has been accustomed to, and physically and mentally we are enormously influenced by circumstances. The sensitive Hamlet, you will remember, was shocked when he heard the gravedigger singing a merry song as he threw up earth and bones from the resting-place which he was making for the gentle Ophelia. Horatio, however, explained away the apparent want of feeling by saying that custom had made it in him a property of easiness. There was really no more reason for the gravedigger to look sad than there is for the doctor and the lawyer to shed tears as they drive through the cemetery in the fourth mourning-coach.

Suppuration in the knee-joint is, of course, one of the most serious complications of osteo-myelitis of the end of the femur, and the general condition dependent on its occurence may be so grave as to call for immediate amputation of the thigh. But I have had cases of the sort in which by free incisions, irrigation, scraping, and drainage I have been enabled to save the limb. Sometimes in spite of all treatment suppuration continues indefinitely, the daily absorption into the blood of small doses of toxins bringing about the condition which was formerly known as hectic fever. Amputation, however, by removing the source of poisoning, may at once initiate the patient's recovery. Another effect of the long-continued absorption of small doses of toxin may be albuminoid disease of the viscera. There, also, amputation may be successfully resorted to.

Under the influence of the growth of the micrococci a virulent toxin is elaborated which, being carried by the blood, disturbs the nervous centres and gives rise to headache, loss of appetite, sleeplessness, delirium, high temperature, sweatings and general distress. This is a good example of septic intoxication, as opposed to septic infection, in which case the germs are multiplying in the blood, as described under the head of pyemia. As a result of this septic intoxication, the patient may die quickly and with very slight warning, the actual cause of the death never having been suspected. The skilled pathologist at a children's hospital, therefore, makes it part of his business in every *post-mortem* examination to inspect the ends of all the diaphyses. That the condition may be one of intoxication, and not of infection, is shown by the fact that when the abscess cavity in some of these cases is scraped out and washed, all grave symptoms subside, the patient immediately becoming convalescent. But though this happy state of affairs is occasionally met with, it is by no means the rule, the germs being very likely to enter the blood-stream.

AUTO-IMMUNIZATION.

The question may arise in one's mind as to how it is that when a child is in so grave a state of pyemia (as he must be when he is at the same time the subject of, say, multiple necrosis and empyema) the toxemia does not for certain kill him outright. The answer is, I think, that he has been quietly and steadily undergoing a course of auto-inoculation and immunization, and that he is in the happy condition of being rendered as unlikely to fall a victim to this particular toxin as a boy who has recently been vaccinated would be to succumb to small-pox. The question which may arise out of the foregoing surmise is as follows: If a patient in this condition of toxemia (from which many people die) can obtain immunity by a natural process of auto-inoculation, why should not the surgeon be able to render him immune by injecting into his veins a serum obtained from the blood of a horse or some other animal which has been duly immunized? At present one is not in the position to answer this question with authority and certainty, but it is quite likely that a happy solution to it will ere long be found by Dr. Wright in the Pathological Laboratories of St. Mary's Hospital, or by some other experimental pathologist.

The antistreptococcic serum is a most powerful agent, and its injection into a patient causes so much shock that his temperature at once drops—perhaps never to rise again.

Every now and then one sees a record in a medical journal of a patient who was desperately ill with puerperal or some other form of septicemia, and that after being injected with some serum she recovered. But the person who reports the case goes too far, I think, when he implies, or actually affirms, that it was the injection which effected the cure. In my humble opinion, there is a great deal too much reckless and random medical writing of this sort. Because a patient finds himself improved after following our own prescription we certainly ought not to assume that it is a simple matter of cause and effect; if the patient insists that it is so, however, we may just smile a mixed smile of modest self-depreciation and conscious power. So much is perfectly harmless and allowable; but when the practitioner stands forth and confidently tells his professional brethren that his treatment has in such and such a case actually cured his confiding patient, he is apt to be drawing too heavily upon their intelligence. Things have certainly changed from the time of Ambroise Paré, who humbly said that he dressed his patients and that God cured them. At the present time, so great have been the advances in the surgical branch of our profession, we are apt to think ourselves competent to work the cure single-handed.

We have comparatively little absolute knowledge of the value of serum-therapeutics, though the future may possibly reveal the fact that these artificial antitoxins are as valuable as they are powerful. In the meanwhile, the practitioner who is called upon to deal with a case of acute septic disease in a child, and is urged to "try the antistreptococcic serum," may find himself somewhat in the position of the youthful David when his dismayed and retiring friends advised him to put on Saul's armour preparatory to going out to meet the boastful Philistine, David pleaded to be excused from employing it, because he had not "proved it." "Prove" is a word which to-day scarcely finds a place in "so-called" orthodox therapeutics, though it is of wide and blessed significance, I believe, among homoeopaths—those happy practitioners who have a trusty drug for every symptom of disease. I wonder of they are as ready as we are to rush to every new and highly-vaunted agent, to prescribe it forthwith, to publish the single case (if it happen to survive), and to declare in terms that are very familiar with ourselves that "it acted like a charm"!

EDITORIAL

SHOULD DAY NURSERIES BE ENCOURAGED?

The question whether day nurseries do more good or more harm is not an easy one to solve, and there is much to be said on both sides. Mr. Burns, President of the National Conference of Infantile Mortality, which was held in London last summer takes the ground that they are a damage to the community, and bases his conviction on the argument that they encourage married women in going out to work while their babies are at an age which requires their presence. The disadvantage under which those children labor who are deprived of maternal nursing and compelled to rely upon artificial feeding is too well-known to permit any doubt that it is a serious count against the day nursery if it actually does, as Mr. Burns believes, cause certain children to be fed artificially who would otherwise enjoy the benefits of breast feeding.

But even apart from the question of the baby's diet, the working of mothers of families in factories and shops is to be deplored, and anything which tends to promote such working must be very carefully considered. It is in all respects a wasteful arrangement, since the observation that has been made so often in regard to child labor seems largely to hold true in this relation also, namely, that in communities where such labor is common, the income of the family is not larger than that secured by the head of it alone where only men are employed. Furthermore, other children besides the one deprived of its natural nourishment suffer from the absence of the mother during the day. Even in poor homes where the mother devotes her time to the household, the children are kept under some control wiser, at least, than their own, are fed on fairly well-cooked and well-chosen food, and put to bed at an early hour. In those homes, on the contrary, where the mother works in the factory, meals are incidental and consist of canned food and all sorts of casual viands, the children run wild in the streets and go to bed when they please, the mother being too tired when she does come home to look after them efficiently. Such employment of married women also has a demoralizing effect upon their husbands who are generally not slow to take advantage of the possibility of loafing while their wives support the family. Yet it is the babies that suffer most, and Mr. Burns states that in some districts the working of mothers in factories doubles the infant death rate.

Yet even admitting all that he says about the disasters following outside employment of mothers, it might be questioned whether a crèche could not be so conducted as to avoid encouraging such labor, while at the same time assisting mothers who were unavoidably obliged to go to work. In order to bring this about it would, of course, be necessary to provide facilities for investigating each case that applied for admission and ascertaining indisputably either that there was no father to support the family or that for some really good reason he was unable to do so at the time. This could only be done where the size of the institution was somewhat limited, but as such a limitation is desirable from other points of view as well, this is not an argument against it.

Another advantageous safeguard is found in exacting some payment for the care of the infant. It has been found that those institutions where the fee is the largest are more largely patronized than those where it is small, and in France where in some cases the amount has been left to the mother to determine, she had put it at a higher figure than the officers of the instiutution had intended. The payment of this fee prevents the pauperization of the beneficiaries of the system, and makes them fellow workers with it for the good of their children.

Another grave danger to be guarded against is found in the case with which such a place may become a focus of infection. Strict and repeated medical inspection is necessary in this respect and eternal vigilence is the price of safety. The lamentable experience of certain institutions for the care of infants in which a gonococcal infection gained lodgment has amply demonstrated this fact. It is better to care for fifty children, so safe-guarded, than for 500 in the lax fashion which exposes them to contagion.

There is a growing inclination to recognize as a leading or even *the* leading function of the crèche the education of the mothers, present and prospective. This may be done by lectures, illustrated with demonstrations in washing, dressing and feeding babies. The purely theoretical instruction does not appeal to the class these are intended to benefit, and the crèche offers an excellent opportunity to make the teaching practical and objective. Not only the mothers, but the older could profit by such a course of instruction.

There is no doubt that a badly or carelessly conducted day nursery is a bad thing, any more than there is that the conditions which necessitate a day nursery at all are a bad thing, but where these conditions exist they must be met, and if intelligence and scientific training are brought to bear upon the problem the crèche may be a means not only of counteracting these conditions in a measure, but also of actually reducing them.

THE REDUCTION IN INFANT MORTALITY. THE HUDDERSFIELD EXPERIMENT

It is now two years since the enterprising Mayor of Huddersfield, England, announced a prize gift of $5.00 for every child born in his district who should attain the age of 12 months. He was prompted, it is reported, to do so by reason of the frightful infant mortality which had been the rule in the district—122 deaths to the thousand—and it was his hope that the money might be an incentive to greater care on the part of the parents.

The results of the experiment has been announced and, although the figures are small, they nevertheless show a remarkable reduction in the mortality during the time of the offer. Although during the past two years health conditions have been unfavorable in the Longwood district, whooping cough and measles having been more than usually prevalent and severe, of the 112 babies born in the first year, 107 actually received the gift. The mortality instead of being 122 to the thousand was much less than half of that. There had been no selection of babies: all classes were represented and even the well to do accepted their gifts without resentment.

The lesson taught has had a marked effect in Huddersfield county and an active propaganda looking for the reduction in infant mortality has been set on foot that promises interesting developments.

SOCIETY PROCEEDINGS

BRITISH SOCIETY FOR THE STUDY OF DISEASE IN CHILDREN

October 19, 1906

Mr. W. Milner Burgess, Chairman

Osteoarthritis.—This case was presented by Dr. T. R. Whipham. The patient was a female, 13 years old, and the disease began about ten months previous, affecting first the wrists and hands and later the knees and ankles. The ends of the bones were enlarged and the synovial membrane swollen. One gland lymphatic gland in the left axilla was enlarged, but no others, nor was the spleen. No significant family history could be elicited.

Deformities.—Dr. Whipham presented another patient, a girl fifteen years old, with a remakable collection of deformities. The left scapula was misshapen and rotated inward, resulting in torticollis, lateral curvature of the spine was noted in the cervical and upper dorsal regions, gaps could be felt in the second and fourth ribs, the left arm was shorter and less muscular than the right and the corresponding shoulder was lifted, the left pinna was deformed, the left side of the face showed underdevelopment, and a high-arched palate was noted.

Congenital Malformation of the Heart.—A female child, ten months old, was presented by Dr. Whipham. Clubbing of fingers and toes was noticeable, and cyanosis was present. No definite murmur was detected although the right side of the heart was enlarged and the first sound was a little soft. Polycythemia was conspicuous. A month previous the red cells numbered 12,900,000 per c.mm. with 150 per cent. of hemoglobin, and 12,000 leucocytes.

Hypospadias.—Mr. Burgess presented two patients, brothers, in one of whom at birth there were two openings in the penile urethra besides one at the meatus. Through the lowest opening a probe could be passed into the bladder. The condition in the other child was much the same. In the discussion of the cases some argued for an early operation and some for one deferred until adult life.

Inability to Supinate Forearm.—A child seven years old and somewhat defective mentally, was presented by Mr. P. Lockhart Mummery, which had never been able to supinate either forearm. The hands were in the position of pronation, and the rotary movement of the wrists was slight. Skiagrams were shown, and a discussion ensued as to whether the radius was or was not normally developed, and if it was whether the condition could be charged upon spasm of the pronators secondary to a weakening of the supinators.

Bilateral Congenital Sinus of the Lower Lip.—The patient presented by Mr. H. S. Clogg, was the fifth child of the family and the only one with any deformity. At birth it had a marked case of bilateral complete hare lip and cleft palate. On each side of the middle of the upper edge of the lower lip is a papilla surrounded on the the side toward the mouth by a groove, communicating with a sinus leading into the lip and about one-fourth of an inch long. The two sinuses do not meet although they converge.

Persistent Arythimia of the Heart.—This patient, male, eight years old, was presented by Dr. Alex. Morrison. There was a neurotic history, and the boy had had a severe attack of measles two years before. There had been persistent variation in the rhythm, marked by the occasional occurence of an extra systole and a long pause. At the moment of intermission there is a pulsation in the right internal jugalar vein, coinciding with the ventricular extra systole. The patient suffers no inconvenience from his peculiarity.

Anterior Poliomyelitis.—This case was presented by Dr. L. Guthrie. The patient, male, three and one-half years old, showed anterior poliomyelitis of the fifth cervical segment of the cord, simulating Erb's paralysis. The disease followed the opening of a small abscess in the right mastoid region when the child was about a year old. Atrophy and paralysis of the right deltoid, biceps, brachialis anterior and supinator longus were present, the supinator brevis being unaffected and the supra and infra spinati only slightly. There was wasting of the clavicular portion of the pectoralis major. It was suggested that division of the fifth cervical nerve and grafting of the distal end into the sixth nerve might be advisable.

Multiple Lupus Vulgaris.—This case, in a boy five years old, was presented by Mr. Pernet. It was of several years' standing and showed three foci on the face and elbow.

Habit Spasm.—Dr. G. A. Sutherland presented a patient, male, six years old, who began to exhibit movements of the face nearly a year ago, and later developed also the following: (1) twisting the mouth; (2) blinking the eyes; (3) jerking out the tongue; (4) jerking the head; (5) jerking the right shoulder; (6) occasionally throwing out the legs and arms; (7) occasionally making curious sounds in his throat. No improvement is perceptible in the condition. There is no history of rheumatism or chorea.

Anemia Pseudoleukemia Infantum.—Two cases were presented by Dr. J. Porter Parkinson. The first patient, male, 20 months old, has exhibited great improvement under treatment by fresh air, iron and arsenic, with application of X-rays over spleen three times a week for five months. The spleen had been reduced 75 per cent. and the blood count had returned almost to normal. A parallel case with the same treatment except that the X-rays were omitted showed no improvement.

Deformity of the Eyelids.—This case was shown by Mr. Sydney Stephenson, in a child six years old. The eyelids could be closed voluntarily, but the palpebral fissure was directed downward and outward so that an unusual amount of the eyeball was exposed, and the lower puncta lacrymalia were wanting. Part of the malar bones and the orbital processes of the superior maxillary bones were also lacking.

Cerebral Diplegia.—This case was presented by Dr. C. O. Hawthorne in a patient, male, five years old. Exaggerated knee jerks and extensor responses were noted on both sides but the spastic condition was most pronounced in the right leg. The arm at that side moved with clumsiness but was not precisely spastic, and the left arm was almost normal. The child was the first of the family, and had been born at term without the use of instruments. He seemed to understand all that was said to him, although he did not talk.

Coloboma of the Iris, Choroid and Optic Disc.

Extreme Depression of Left Half of Frontal Bone.—These cases were also presented by Dr. Howthorne. The condition in the latter was believed to have resulted from the use of forceps at the child's birth.

ABSTRACTS

Teaching the Deaf Child to Hear.—HUDSON-MAKUEN, G. (New York Medical Journal, vol. lxxxiii., No. 11, p. 540, March 17, 1906). More than 200 years ago it was noted that so-called deaf-mutes had a perception of sounds. In some instances they could distinguish between high and low-pitched sounds, but the aural apparatus was so defective that speech was impossible. Recently marked attention has been devoted to this class of cases in an effort to improve the hearing by vocal gymnastics. Urbantschitsch, of Vienna, has made an extended series of investigations along these lines, and his methods have been generally adopted in Austrian schools for the deaf. Natier, of Paris, has instituted a system of aural gymnastics for adults, using a series of tuning-forks. The forks vary from a low to a high pitch, and by selecting those having the appropriate number of vibrations he aims to stimulate action in the sluggish nerves and arouse latent hearing. Urbantschitsch depends almost wholly on the speaking voice for the hearing exercises.

The writer reports the case of a girl who at five years of age was regarded as a deaf-mute. It was observed that she could hear and in some degree enjoy certain forms of instrumental music, although she gave no indication of any appreciation of speech sounds, and her only means of communication was that of pantomime. Under vocal gymnastics this patient within a year was able to speak many words distinctly. A child may have a fair degree of hearing power and yet lose it from disuse. Never having experienced the advantages of acute hearing they have no incentive to give attention to sounds that are not clearly audible to them. The child does not hear enough of the conversation about him to attract his attention, and there is no inducement to continue to listen, and hence the auditory centers do not develop. The practical application of vocal gymnastics must depend upon the individual peculiarities. Only those children having a remnant of hearing power can be regarded as suitable subjects. The determining of this hearing power often taxes the ingenuity of the physician to the utmost. Frequently musical instruments are valuable for this purpose. Children giving the slightest response to any sound should have the hearing exercises. It is not difficult to teach even totally deaf children to speak and to understand speech through the senses of touch and sight, but the voice is always harsh and disagreeable. The sense of hearing is essential to the modulation of the voice, and this is of diagnostic importance. The so-called deaf-mute who learns to speak in modulated tones has some hearing power that may be improved by exercise. Teaching the child to speak is quite as important as teaching him to hear; the one helps the other.

Ataxia in Childhood.—Batten (Brain, Autumn and Winter, 1905). The writer has studied a series of cases of ataxia excluding Friedreich's syndrome, the ataxia which occurs in tumors and lesions of the cerebellum and midbrain, and in certain cases of diphtheric paralysis. Based on the clinical type the remaining cases are classified as cerebellar diplegia, which are divisible into three main groups: (1) Cases in which ataxia has been noticed from earliest life and in which there is a tendency to gradual improvement. (2) Cases in which ataxia has suddenly developed during the course of or after some acute illness in a child who was formerly quite healthy. The prognosis in these cases is relatively good. (3) Cases in which ataxia has gradually developed in a child who has been healthy and of normal development until the onset of the disease. This is the progressive cerebellar ataxia, and the prognosis is bad. In all of these cases the cerebellum seems to be the organ that is primarily affected, though it may be associated with other lesions.

Barlow's Disease in the Island of Cuba.—Duenas (Archives of Pediatrics, March, 1906). Cuban medical literature has no data in reference to infantile scurvy. In 1901 the writer published some clinical notes on the disease, and since then he has devoted considerable attention to it. He has found that it exists on the island and has the same features that are assigned to it in other countries. It is apparently less frequent than in other parts of the world, though probably this is due to a failure to recognize the clinical type of the disease. The disease has developed in children fed upon boiled cow's milk, sterilized cow's milk, condensed milk, and maternal milk. The exact causes underlying the development of the disease in different cases are still unknown. It is probably some noxious element contained in the milk or possibly due to a defective elaboration of the ingested material. There is apparently some functional deficiency in the individual which acts as a causative factor. It is probable that scorbutic anemia and the hemorrhagic conditions associated with it are due to a chemical rather than to an infectious agent.

General Convulsions in Early Infancy Induced by the Taking of Food.—Eustace Smith (Brit. Med. Jl.). It is a familiar fact that in early life convulsions of reflex origin and often of little moment may arise from trifling irritation acting upon the periphery of nerves in various parts of the body. In infants the alimentary canal is the most common seat of this irritation, and a general convulsive seizure induced by the pain and irritation of teething or by a meal of indigestible food is a matter of common experience with every one. It has happened to me to meet at rare intervals with a case in which a healthy infant has been thrown into violent fits a few minutes after taking a meal of some simple food which an ordinary child, even the youngest, would digest with ease, and this without the seizure being preceded by vomiting, crying, or the slightest sign that the food did not completely agree.

The first instance of the kind which came under my notice, and made a strong impression upon me, was in a baby of a few weeks old, the child of a hard-working and experienced practitioner, who was naturally much alarmed and perplexed by the singularity of the case. Since its birth the infant, although fed with judgment, had fallen into strong convulsions a few minutes after taking his bottle, and the fits had been repeated with the utmost regularity after each meal. At the father's request I went to his house to see the child. I found a seemingly healthy and well-nourished infant, who looked comfortable and placid, and appeared to be in every way in a normal state. The child was being fed upon Swiss milk and water. He was given in my presence about an ounce of this mixture, which he sucked from his bottle with apparent enjoyment. He finished his meal, and the bottle was replaced upon the table. The child then closed his eyes and appeared to be sinking into a quiet sleep, when in about two minutes he began all at once to twitch in the face; then to jerk his limbs in violent convulsions; his chest became fixed; he ceased to breathe; his complexion turned darker and darker; then he stretched himself out with a slate-blue face, and lay quite still. We did what we could to re-establish respiration, but without any success; the child was dead. The whole attack did not last longer than thirty seconds, if it lasted so long. This distressing experience occurred many years ago. Since then I have seen some four or five other cases of the same kind, although without the same tragic ending, and found that with ordinary treatment and some help to the digestion the attacks could be brought quickly to a close. All the cases have been in hand-fed babies, and have presented exactly the same characters. The patients have all been healthy looking infants, well-nourished and apparently strong, not peevish or fretful, or sufferers from abdominal discomfort or other sign of indigestion, but who after each meal of the simplest food were thrown without any warning whatever into strong convulsive fits. The peculiarity of the cases is, of course, the complete absence of any sign of uneasiness between the end of the meal and the beginning of the seizure. If I had not seen with my own eyes that this could be so I do not know that I should be able to believe it; but having seen it I am sure of the fact.

I have brought these cases forward, not for their own sake, although their interest is not to be denied, but because they seem to me to throw a strong light upon the mechanism of pyloric obstruction in the newborn infant. There are some who hold that this contraction is a congenital lesion, that the infant comes into the world with a thickened and narrowed pylorus. Others, with whom I agree, look upon the contraction as due in the beginning to a reflex spasm of the pyloric wall induced by the taking of food, and believe that the continued repetition of the contraction determines a hypertrophy of the muscular layers which encircle the opening. That the signs of obstruction are often absent at birth, and may not appear until an interval of some weeks has elapsed is a strong argument in support of this view.

I submit that the cases I have just brought forward furnish a practically conclusive argument in favor of the spasmodic theory. If such mild irritation as is caused by the mere presence of food in the stomach can induce general convulsions in an impressionable child, why should it not be able to set up a local spasm of the pylorus? It has happened that the local spasm has been actually conjoined with general convulsions, as appears in a case published by Dr. Walter J. Harper, a very characteristic case which ended in recovery. If these nervous manifestations can occur together, surely they may also occur independently of one another.

The tendency to local spasm in infants is a fact universally recognized. A common example of it is laryngismus stridulus. This laryngismus may occur alone, or it may be complicated with general convulsions, or even alternate with them. It may be said that if pyloric obstruction were due to local spasm induced by gastric irritation, the cases of general convulsions I have instanced above should all of them have been complicated by spasm of the pylorus; but this does not necessarily follow. To take laryngismus again. This local spasm is commonly the consequence of post-nasal irritation, and can be put a stop to by treating the post-nasal catarrh. General convulsions may also be induced by post-nasal irritation, as I have seen again and again; but either may occur without the other, although the irritant capable of exciting them is the same. So I see nothing unreasonable in believing that gastric irritation may set up general convulsions without pyloric spasm, or pyloric spasm without general convulsions, or both together.

Transposition of the Viscera.—RANDOLPH (New York Med. Jour., November 18, 1905). The author reports the case of a boy, aged 9 years, in whom the apex of the heart was situated half an inch within the right mamillary line, and an inch below the nipple in the sixth intercostal space. The maternal grandfather of the patient had also transposition of the thoracic viscera, a feature of very considerable interest.

Cases of Relapse in Measles.—LEACH (Lancet, December 23, 1905). The author reports a recent epidemic (262 cases) of measles at Ledesma, in the Argentine Republic. Four of these cases relapsed. The first was a girl aged 10 years, who developed a well-marked rash fourteen days after recovery, with all the usual premonitory catarrhal symptoms. The second was an infant, aged 11 months, in whom symptoms reappeared two days after recovery from the first attack, and a well-defined rash two days later. An infant of 16 months, living in the same house as the last case, was seized eight days after the first eruption had faded. The fourth patient was a child aged 3 years. In her case the first attack was very mild, with few constitutional symptoms, although the rash was typical and abundant. The temperature, however, did not return to normal after the disappearance of the eruption, and on the eleventh day a fresh rash appeared which at first was discrete but later became so abundant that the whole surface of the body was covered. This eruption remained out for seven days before beginning to fade. On the twenty-second day from the commencement of her illness the patient developed a mild broncho-pneumonia. It is interesting to note that all four cases eventually recovered, although in the third convalescence was very much prolonged.

Pneumonia Ushered in by Abdominal Symptoms.—HOOD (Lancet, December 30, 1905). The author records, in the course of a post-graduate lecture among others, the two following instructive cases. A delicate lad had during the night been suddenly seized with severe pain over the left epigastric region. The pain was accompanied by vomiting, which had been incessant for several hours. There was a temperature of 102 deg. F., and the breathing was quick. During the first twenty-four hours the stomach irritation was practically the only symptom, but the following day sharp crepitant râles at the base of the left lung, followed by consolidation, established the true nature of the illness. The other case is that of a young girl who had been operated on ten days previously for appendicitis. There had been no untoward symptoms, and the wound was perfectly healthy. On the eighth or ninth day after the operation the patient was seized suddenly with illness of an indefinite nature, the principal symptom being extreme irritability of the stomach. No food could be retained, and incessant attacks of vomiting were rapidly sapping the strength of the patient. Forty-eight hours after the commencement of the illness definite signs developed at the base of the left lung. There was a slight cough and quickened inspiration. The cough increased, becoming paroxysmal. The patient eventually made a complete recovery. Hood urges the importance of not neglecting a complete and thorough examination of the chest in all cases of acute abdominal pain which are sudden in onset, accompanied by pyrexia and quickened respiration. In such cases the physical signs denoting implication of the chest may be some hours, not infrequently some days, before developing sufficiently to warrant an exact diagnosis.

A Case of Melaena Neonatorum.—HEAP (Lancet, December 30, 1905). The author reports the case of a strong male infant who, until thirty-three hours after birth, was perfectly well. He then vomited quite suddenly a large quantity of red blood, and also passed a considerable quantity of dark-colored blood *per anum*. The child, however, did not appear to suffer much from the effects of the hemorrhage, as he was warm and only slightly pale. He was kept warm and quiet, and given frequent sips of plain water. Three hours later the hemorrhage recurred. The whole aspect of the child now became changed. There was now intense anemia, the face had a drawn look, and the cry became feeble and whining. He was given 15 minims each of castor and olive oils, together with constant sips of iced water. This was continued for twenty-four hours, when no further hemorrhage was found to have taken place. The motions gradually became normal, and eventually the child recovered, although at three weeks old he was still somewhat anemic and feeble.

On the Plantar Reflex and Babinski's Phenomenon in 1,000 Children.—ENGSTLER (Wein. klin. Wochens., 1905, No. 22). As a result of the examination of 1,000 children up to the age of three not suffering from any cerebro-spinal affection Engstler found that the new-born, and especially those born before term, react with dorsal flexion, that in the third year of life plantar flexion is the normal response. During the period of change from dorsal to plantar flection, more especially during the second year, the response may be absent altogether. These results show that Babinski's phenomenon can only be considered of value after the second year.

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ORIGINAL ARTICLES

RICKETS IN RELATION TO THE DURATION OF LACTATION*

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The clinical observer of disease in childhood is continually confronted by an immense number of patients exhibiting the immediate or more remote symptoms or rickets, and in a study of the disease he is forced to consider the influence of the various methods of infant feeding on its incidence, maternal nursing being naturally the first condition to come under consideration.

In a former paper I have discussed the occurrence of the return of menstruation during lactation and also the overlapping of pregnancy and lactation, and have shown that whereas the former conditions by no means necessitates weaning, the latter undoubtedly does, and owing to its comparatively frequent occurrence and the usual date of its onset, I was led to recommend a lactation of eight month's duration. I have since sought to determine the relation of the incidence of rickets to the varying conditions under which the function of lactation is exercised and to the duration of the exercise of this function.

With this object in view I have examined, irrespective of the cause which led the mother to seek advice, 200 children of different families and aged from 6 months to 3 years. These children I have divided according to their early feeding into the following four categories:

(*a*) "Breast feeding," that is, children reared wholly or mainly on the breast for from 8 to 12 months, and also children aged from 6 to 8 months at the date of examination, who had up to that period been nursed wholly or mainly on the breast.

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*Brit. Med. Jl.

(*b*) "Hyperlactation," that is, children reared wholly or mainly on the breast for over twelve months.

(*c*) "Mixed feeding," that is, children reared partly on the bottle and partly on the breast for from two to eight months, and also children reared wholly on the breast for from two to eight months.

(*d*) "Bottle feeding," that is, children reared entirely on the bottle, or where breast nursing lasted less than two months.

This classification was adopted as being the most practical, although by using it one suffers under the obvious disadvantage of being unable to consider the conditions existing where the infants are strictly speaking breast-fed.

Marked physical signs alone were considered as definite evidences of rickets, and as such were taken marked beading of the ribs, enlarged epiphysis, wide fontanelle, and deformities of the thorax, limbs, and spine; while cases with slight beading of the ribs, late teething, marked head sweating, recurrent bronchitis, contracted chest, etc., were considered as slight cases of the disease.

Of these 200 cases rickets was marked in 61
" " " " " " slight in 55
" " " " there was no rickets in 84
rickets accordingly occurring in 116 cases or 58 per cent.

A classification according to age shows:

Of infants aged—
from 6 to 12 months rickets was present in 55 per cent.
" 12 to 18 " " " " " 63 " "
" 18 to 24 " " " " " 65 " "
" 24 to 36 " " " " " 52 " "

TABLE I.—*Showing the Occurrence of Rickets in the Cases Classified according to the Nature of the Early Feeding.*

	Rickets. Marked.	Rickets. Slight.	Total Rickets.	No. Rickets.	To. No. of Cases.
(*a*) "Breast"	18	27	45	45	90
(*b*) "Hyperlactation"	10	8	18	13	31
(*c*) "Mixed"	5	5	10	5	15
(*d*) "Bottle"	28	15	43	21	64

From Table I it is seen that the amount of rickets among infants mixed-fed is approximately the same as among those bottle-fed, but differs in this respect, that whereas among the former the percentage number of marked cases of rickets among those suffering from the disease was 50 per cent., in the latter it was 65.1 per cent.

TABLE II.—*Showing the Relation of the Incidence of Rickets to the Position in the Family of the Child.*

		(*a*) Breast.		(*b*) Hyper-lactation.		(*c*) Mixed.		(*d*) Bottle.		
Position in Family of Child.	No. of Cases.	Rickets.	*Nil.*	Rickets.	*Nil.*	Rickets.	*Nil.*	Rickets.	*Nil.*	Percentage Rickets.
First	39	5	15	1	1	3	1	9	4	46
Second	41	7	10	4	2	2	2	10	4	56
Third	33	11	8	2	6	—	—	5	1	55
After third....	87	22	12	11	4	5	2	19	12	66

In Table II the most marked feature appears to me to be the steady increase in the amount of rickets with successive "breast-fed" children in the family. Of first children "breast-fed," 25 per cent. showed rickets; of second children, 41 per cent.; of third, 58 per cent.; and of those later, 65 per cent., this gradual increase being probably in part accounted for by the later children getting a less plentiful supply of maternal milk than the earlier. Of children later than third in the family, however, the percentage of those with rickets among the "breast-fed" not only equals, but even exceeds, that of corresponding children bottle-fed; and, consequently, I was induced to consider the occurrence of rickets among the later children in relation to the previous general reproductive history of the mothers.

From the above figures it seems clear that bottle-feeding *per se* has no greater tendency to produce rickets among later children than among those earlier in the family.

The question accordingly arose: Can it be shown that rickety later children generally are born of mothers with an exceptional previous lactational strain, or do mothers of later "breast-fed" show greater previous strain than mothers of later bottle-fed infants? If the latter be the case, then the occurrence of rickets may be due to some fault in the maternal milk or to congenital weakness of the child.

Of the 161 children later than first in the family, in 146 cases the previous reproductive history of the mother since marriage was carefully investigated:

Of these 146 cases, 40 were cases of second children.
" " " " 29 " " " third children.
" " " " 77 " " " children later than third.

The accompanying tables show the early feeding in these cases.

TABLE III.—*Showing the Presence or Absence of Rickets in Children Second born in Connection with the Early Feeding of these Children and also of those First-born.*

	Rickets.					No Rickets					
	"Breast-fed."	Hyperlactation.	Mixed Feeding.	Bottle.	Total Rickets.	"Breast-fed."	Hyperlactation.	Mixed Feeding.	Bottle.	Total No Rickets	Combined Total.
(*a*)	1	2	—	2	5	2	1	2	3	8	13
(*b*)	1	1	—	2	4	1	—	—	—	1	5
(*c*)	3	—	1	1	5	2	—	—	—	2	7
(*d*)	2	1	1	4	8	5	1	—	1	7	15
Total	7	4	2	9	22	10	2	2	4	18	40

(*a*) = First-born child "breast-fed."
(*b*) = " " hyperlactation.
(*c*) = " " mixed feeding.
(*d*) = " " bottle-feeding.

In Table III, the rachitic and non-rachitic second-born children have respectively been subdivided into 4 groups according to their early feeding. In addition, the antecedent lactional history of each case is noted by the position in the row (*a*), (*b*), (*c*), or (*d*).

From this table it is seen that of 18 second-born children where the first-born child was either "breast-fed" or enjoyed hyperlactation—that is, cases in rows (*a*) and (*b*)—9 were rachitic, whereas of 22 where the first-born was either mixed-fed or bottle-fed—that is, cases in rows (*c*) and (*d*)—13 were rachitic, and, consequently, in these cases any previous lactational strain, which necessarily must be slight, has no necessary relation to the occurrence of rickets.

From a corresponding table drawn up for children third in the family, I am also unable to distinguish any marked connection between lactational strain and the occurrence of rickets, with this notable exception, that of 7 children enjoying hyperlactation, 5 showed evidences of rickets.

Table IV.—*Showing Presence or Absence of Rickets in Children later than Third in the Family in Relation to the Early Feeding of these Children and the Previous Occurrence of Maternal Lactational Strain.*

	Rickets.					No Rickets.					
Previous Lactational History.	"Breast."	Hyperlactation.	Mixed.	Bottle.	Total Rickets.	"Breast."	Hyperlactation	Mixed.	Bottle.	Total No. Rickets.	Combined Total.
(*a*) All previous children on bottle....	—	—	—	5	5	—	—	—	1	1	6
(*b*) No lactational strain..............	9	—	3	4	16	4	1	1	6	12	28
(*c*) Slight lactational strain............	5	2	1	5	13	4	1	2	2	9	22
(*d*) Marked lactational strain..........	5	6	2	3	16	2	1	—	2	5	21
Total	19	8	6	17	50	10	3	3	11	27	77

As lactational strain was considered: (1) the overlapping of pregnancy and lactation; (2) hyperlactation; (3) repeated rapidly succeeding pregnancies and lactations.

In Table IV, as in Table III, the rachitic and non-rachitic children have been divided according to their early feeding, while their position in row (*a*), (*b*), (*c*), or (*d*) marks their relation to previous lactational strain. Consideration of this table discloses the following facts:

(1) Of the mothers of rachitic children previous lactational strain was present in 29 out of 50 cases, or 58 per cent.

Of the mothers of non-rachitic children previous lactational strain was present in 14 out of 27 cases, or 52 per cent., which apparently shows that previous lactational strain does to a slight extent produce a tendency to rickets in the child, a result at variance with that found in the case of second and third children in the family.

(2) Previous lactational strain was present in 16 out of 29 "breast-fed" infants, or 55 per cent., while in infants with hyperlactation it was present in 10 out of 11, or 91 per cent.; these two classes combined showing 65 per cent. of cases in which there was previous strain.

In 12 out of 28 bottle-fed infants, or 43 per cent., this strain was present, and in 5 out of 9, or 56 per cent., mixed-fed infants; these two classes combined showing its presence in 46 per cent. of cases. It is thus apparent that children born of mothers who had undergone previous lactational strain were in a considerable majority of cases nursed on the breast.

(3) Rickets occurred among "breast-fed" infants in 19 out of 29 cases, or 66 per cent.

Rickets occurred among infants with "hyperlactation" in 8 out of 11 cases, or 73 per cent. These two classes combined showing the presence of rickets in 68 per cent. of cases.

Rickets occurred among bottle-fed infants in 17 out of 28 cases, or 61 per cent.

Rickets occurred among mixed-fed infants in 6 out of 9 cases, or 67 per cent. These two classes combined showing the presence of rickets in 62 per cent. of cases.

Rickets accordingly was appreciably more marked among children "breast-fed" for over eight months (including those with hyperlactation) than among other children, and as these "breast-fed" children were, in a large majority of cases, born of mothers who had undergone greater lactational strain, and as this lactational strain does only to a slight extent predispose the infant to rickets, consequently one is forced to a consideration of the composition and fitness of the maternal milk in these cases.

In the literature on the subject of the changes, if any, taking place in maternal milk with advancing age and in successive lactations, systematic series unfortunately are by no means plentiful.

Personally, I am unable to record my results owing to errors having occurred in the duration of the period of rest prior to the withdrawal of the milk. By very many observers it has been clearly shown that great variations exist in the normal composition of milk, not only in the milk of different mothers, but also in that of the same mother at different times. Thus it is found that in the course of one lactation the milk varies in composition according to the period of the lactation, the changes consisting in a fall in the amount of the proteids and salts, and a rise in the sugar and fat (Pfeiffer). Variations in the amount of proteid and fat present are wide, but whereas the fall in the amount of proteid is very distinct, the amount of fat varies but little according to the period of lactation, while the proportion of sugar is throughout very constant (Holt). Variations in the amount of fat occur with each nursing, the later milk being constantly found richer in fat than the earlier, and the proportion sinking again during the period of rest; while it has also been found that fat is more plentiful when the infant is only partially breast-fed than when it is entirely on the breast (Reyher). Holt states that the age of the mother has no constant influence on the composition of her milk, nor has the number of previous pregnancies, except such influence as results from the effect upon her general health. In this latter connection Sharples and Darling, as the result of 117 analyses of human milk, conclude that "During the first lactation the milk on the average is weaker in fat and proteids, but stronger in sugar than in subsequent lactations. These differences may or may not be due to age."

That the exact changes, if any, produced in the composition of milk by advancing age and successive lactations, have not, so far, been determined is clear, observers, however, agreeing that an unsatisfactory condition of maternal milk does exist, that the undue prolongation of lactation and rapidly-succeeding pregnancies conduce to this condition, and that this unsatisfactory condition can lay the foundation of rickets (Henoch, Holt, Thomson). The mothers of infants in the category I am now considering may be said to fall into this class, and the conclusion is arrived at that their milk was not in every case or in all respects a satisfactory food for the children.

While the disadvantages and insufficiencies of hand-feeding are patent to the least skilled eye, the beneficent effects of maternal nursing are correspondingly striking. Every day we meet with weakly, ill-nourished women suckling a strong healthy infant, and the idea is fostered that from breast-nursing nothing but benefit to both mother and child accrues. Women of the working class who can and do nurse, very frequently nurse for a period of time altogether out of proportion to the needs of the infant. The number of such nursing mothers undoubtedly is distressingly small, but of those who do nurse, the number who do so excessively long is distressingly large. No one questions that, where practicable, maternal nursing, within limits, is the one and only procedure for the good of both mother and child; but in order to secure a continuance of this invaluable supply of nourishment it is imperative that it be utilized in moderation, with due consideration and avoidance of the undoubted evils resulting from its undue prolongation or the condition of an overlapping pregnancy, such conditions foreshadowing a diminished value of the milk in future lactations, and consequently forming a serious handicap in the natural nutrition of later infants.

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AT WHAT AGE SHOULD A CLEFT OF THE PALATE BE CLOSED?*

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Of recent years there has been a marked tendency towards the performance of the operation for closure of the cleft of the palate at an earlier age than formerly. But surgeons whose experience of this operation renders them well qualified to express an opinion are by no means agreed as to the age at which it is most desirable to operate. While, on the one hand, Mr. Arbuthnot Lane says the best age, provided the health of the child permits of it, is during the fifth week, Mr. James Berry, on the other, is strongly of opinion that in the vast majority of cases the age at which the operation is undertaken with most advantage to the patient is some time during the third year of life.

During the last fourteen years I have performed more than 300 operations for hare-lip, or cleft palate. The ages of the patients varied from a week to twenty-one years. From the experience thus gained I have arrived at the following conclusions: The usual type of deformity is a complete cleft of the palate associated with a hare-lip, and in the following remarks I refer more particularly to this class of case.

So far as the palate is concerned the chief object of the operation is to render the powers of speech more perfect than they otherwise could be. Therefore, from a purely theoretical point of view, the earlier in life the cleft is completely closed the better.

From a practical point of view, however, there are several objections to the complete closure of the cleft during infancy. These objections have reference to the operation of staphylorrhaphy rather than to that of uranoplasty.

In the case of a child born with a complete cleft of the palate, the subsequent powers of articulation, though greatly improved, will never be perfect, even though an operation has been successfully performed during infancy. The explanation, I believe, is that when the cleft involves the hard palate, the defect in development is not limited to the structures of the mouth, but also includes the nasal chambers, which are so largely concerned in the production of the voice; consequently some imperfection in articulation is to be expected in cases in which the hard palate has been involved, even though an operation for the closure of the cleft has been successfully performed. If, on the other hand, the defect is limited to the soft palate, the prognosis is much more hopeful. I have had several cases in which I operated for a cleft of the soft palate only before the children could talk, and three or four years afterwards they spoke quite naturally, it being impossible to detect from their speech that the palate had ever been cleft.

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*Brit. Med. Jl.

As further confirmation of the statement that the cleft in the palate is not entirely responsible for the nasal character of the articulation, one has only to remember that from time to time children are seen who speak as if there were a cleft of the palate, but on examining the mouth the only defect noticeable is that the palate is highly arched, thus encroaching upon the nasal chambers.

I am quite convinced that in order to obtain the best result in respect to articulation, it is essential for the soft palate to be well formed and freely movable. Otherwise it cannot act satisfactorily as a nasopharyngeal diaphragm.

OPERATION UPON THE HARD PALATE.

I believe the cleft of the hard palate may with advantage be closed during infancy, not by raising a muco-periosteal flap from the palate bones on either side and uniting them in the middle line, for, owing to the width of the gap, this would in most cases be impossible, but by raising a muco-periosteal flap from one side, and turning it over on a marginal hinge, as suggested by Mr. Lane.

If this is decided upon, it certainly should be done before operating upon the lip. A raw surface is thus left to granulate, but in the hard palate, provided the gap is closed, excess of cicatricial tissue is of no moment.

OPERATION ON THE SOFT PALATE.

In case of the soft palate, however, the matter is somewhat different. In order to obtain a well formed and freely movable soft palate, excess of cicatricial tissue must be avoided. If the cleft of the soft palate is closed during infancy, this can only be done by means of a turnover flap, which of necessity leaves a raw surface to granulate, and will ultimately cause some contraction and stiffening of the parts. If, on the other hand, the operation upon the soft palate is postponed until the child is about two years of age, there is more tissue to work with, and it is generally possible to fashion a good soft palate and uvula by paring the edges of the cleft and uniting them in the middle line. Excess of cicatricial tissue is thus obviated, for union takes place by first intention.

Though I have of recent years operated upon the hard palate during infancy and closed the cleft of the soft palate later, I am not convinced that the subsequent powers of articulation in these children have been better than in those in whom the complete operation has been postponed until the second or third year. I am convinced, however, it is unwise to operate upon the soft palate during infancy, for my best results have been obtained when the cleft was closed a few years later in life.

BROPHY'S OPERATION.

Professor Brophy, of Chicago, has drawn attention to the fact—which I have on several occasions verified—that in a complete cleft of the palate the superior maxiliary arch is excessive in diameter by just the width of the cleft. For some years Dr. Brophy has overcome this defect by forcing the maxiliary and palate bones together in the middle line. The cleft thus obliterated, it only remains to pare the edges and unite them together. I have on two occasions adopted this procedure, following to the best of my ability the written instructions of Dr. Brophy. In neither case was I successful in obtaining satisfactory approximation of the palate bones, and therefore did not proceed further with the operation. There is no doubt that in plastic work especially the skill of the individual surgeon counts for a very great deal, and it is quite possible that my defect in manual dexterity accounted for my want of success. However that may be, I do not propose to again attempt the operation until I am satisfied that the results, as regards speech and appearance, are after this method appreciably better than can be obtained by less severe and less dangerous measures. After all said and done, the object with which an operation for cleft palate is undertaken is to render the afflicted individual more capable in later years of fighting his battle in life. There can be no virtue *per se* in closing the cleft during infancy; the real test of the operation is the remote and not the immediate result.

CONCLUSION.

All surgeons are agreed that the cleft should be completely closed during the first few years of life; but the point yet to be decided is whether it is better to operate during early infancy or during early childhood. For my own part, for reasons I have already mentioned, I prefer as a general rule to postpone operating upon the palate until the child is between two and three years of age, and then at one operation completely close the cleft.

The question, however, is clearly a matter of evidence, and well worthy of investigation.

In London there is surely plenty of material available; and if at one of the medical societies a series of cleft palate cases from four to six years after operation were brought forward by surgeons who hold diverse views respecting the age at which the operation should be performed, in order to demonstrate the after-results of their operations (a set-piece for recitation, such as "This is the house that Jack built," would certainly be a novelty), some light would be thrown upon the vexed question: At what age should the operation be performed?

ACHONDROPLASIA*

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Achondroplasia, though a rare disease, is of ancient origin. Dr George Pernet[1] has recently drawn attention to the fact that several Egyptian statues in the British Museum—notably one of the ancient god Pthah—clearly illustrate its characteristic deformities. Charcot and Richer[2] have also shown that many of the dwarfs at the Court of Philip IV who were painted by Valasquez were in all likelihood its victims.

Though apparently uncommon, it probably occurs with considerable frequency, but has failed to attract attention because most cases are either stillborn or survive birth for but a short period. Formerly the survivors were mostly regarded as examples either of cretinism or rickets, and it was not until 1860 that the condition came to be recognized as a definite pathological entity. In that year Müller[3] published a series of careful observations which went to show that the disease is one of primordial bone cartilage, and that the inhibition of the growth of the long bones, which is one of its most prominent characteristics, is due to a disturbance of the normal arrangement in rows of the proliferating cartilage cells. In 1873 an account was given by Urtel[4] of the macroscopic and microscopic appearances presented by a stillborn child, which in all details corresponded with those recorded by Müller a few years before. Earlier observers had recorded cases which were described under the title of Congenital Rickets, but which, in the light of more recent knowledge, were undoubtedly examples of achondroplasia. The earliest published record dates back to 1791, when Sömmering[5] gave an account of the post-mortem appearances in a case of fetal abnormality which he was unable to classify, but the description of which leaves no doubt as to its nature. In 1836 Busch[6] recorded another case of the disease, under the title of Congenital Rachitis.

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*Brit. Med. Jl.

Among other writers who have contributed to our knowledge of achondroplasia mention may be made of Schidlowsky,[7] Eberth,[8] Kirchberg and Marchand,[9] Kaufmann,[10] Marie,[11] John Thomson,[12] Archibald Garrod,[13] William Turner,[14] P. W. Nathan,[15] Harold Balm and Archibald Reid.[16]. The term "achondroplasia," which was first suggested by Parrot in 1878, is used synonymously with the more clumsy, but also more accurately descriptive, title, "chondrodystrophia fetalis," proposed at a later date by Kaufmann. Though it is now recognized that achondroplasia is an entirely different disorder from rickets, its close resemblance, in many particulars, to that disease led to its being variously described as fetal, intrauterine, or congenital rachitis. It is also referred to by more than one author as fetal cretenism. In 1881 Mr. Samuel G. Shattock,[17] in describing the features of a fetal skeleton which he exhibited at a meeting of the Pathological Society, said that the condition was "variously considered as distinct from and identical with that ordinarily known as rickets." Certain specimens—the limb-bones, skull, and brain—presented to the Pathological Society in 1884 by Sir Thomas Barlow,[18] obviously belonged to an achondroplasic fetus; and while it was admitted by the exhibitor that the appearances differ so essentially from those found in true rickets that such cases "ought to be relegated to a class of malformations depending on a very early vice of development," yet it is contended that, in accordance with the views of Virchow,[20] they probably belong to a "very pronounced fetal type of cretinism." In the second edition of Liston's *Elements of Surgery*,[19] published in 1840, there is a striking frontispiece which the author refers to in the text as a curious case of congenital rickets. This skeleton exhibits in the most graphic manner the distinctive landmarks of achondroplasia.

The external characteristics of the disease resemble rickets in so many ways that the two conditions may readily be mistaken the one for the other, especially as in children who suffer from achondroplasia there is a liability to the superimposition of rickets at the usual age for the onset of that disorder. The confusion with cretinism is also not suprising, because the physical features which accompany it are somewhat similar to those met with in achondroplasia, especially in infancy, and the few cases of the latter disorder which survive have only recently attracted sufficient attention to enable the discovery to be made that mental deficiency is not one of its accompanying phenomena. The general appearance of an achondroplasic child is characteristic. It is a dwarf, with a large head, pug-shaped nose, short and often bowed limbs, a prominent abdomen, and marked lordosis. The legs are always so short as to be out of proportion to the size of the trunk of the body, and this stunts the figure in an unsymmetrical way which is quite different to other varieties of dwarfism where the trunk and limbs are shortened in relative degree. The arms also are too short, so that the fingertips never reach to the level of the hips as in the normal individual. The limb bones, besides being short, are usually bent and deformed. The disproportion between the trunk and extremities is readily demonstrated by measurements such as those which are furnished in the table at the end of this report. In the normal infant the umbilicus marks the central point between the crown of the head and the soles of the feet; whereas in the achondroplasic child the central point of the body is above the umbilicus, sometimes as high as the ensiform cartilage, and this relationship continues throughout life. It has been pointed out by Nathan that the dwarfism is only observed on standing; when the child is in the sitting posture its height is not far short of that of an ordinary person of the same age. The abnormal size of the head is confined to the vault of the cranium, which is unduly developed and out of proportion to the face. It may equal or even exceed, in its circumferential measurement, the length of the body, and there is decided prognathus, which is rendered more pronounced by the marked retraction of the bridge of the nose. This recession of the base of the nose is not due, as in congenital syphilis, to bone disease, but is produced, together with the prognathus and disproportionate vault, by premature synostosis of the basilar and sphenoid bones, giving rise to a deficiency in length of the base of the skull. The lips and eyelids are thickened and, from excess of subcutaneous tissues, there is an exaggeration of the natural dermal folds. The tongue is described by some observers as large and protruding, but this is not a constant feature. The hair on the head and other parts of the body is abundant and healthy, while the skin is well nourished and neither harsh nor scaly. The fingers and toes are short and spatulate. The hands are odd in shape; they are foreshortened and fat, with fingers of about equal length which taper to their extremities, and at the level of the middle phalangeal joints separate from one another. This separation, as has been pointed out by Dr. Thomson, is specially marked between the middle and ring fingers. The shortening of the long bones of the limbs is apparent at birth, but it becomes an increasingly notable feature as the child grows. The natural curves of the shortened bones are exaggerated, and they become abnormally thickened transversely. All the epiphyses appear more or less enlarged, and a distinctive rosary is present at the junction of the ribs with their cartilages, but it would seem that in most instances the swelling is caused by changes in the diaphyses, and that the epiphyses are altered in a certain proportion of cases only. In contradistinction to the changes which take place in the cartilage-bones of the base of the skull and of the extremities, the bones that are formed in membrane and those developed from cartilage late in intrauterine life, such as the clavicle, scapula, sternum, spinal vertebræ, etc., remain unaffected. The contrast between the semi-membranous, bossed condition of the flat bones of the skull in rickets and their normally grown, firmly developed state in achondroplasia is very striking. The mental faculties remain intact. Other congenital defects not infrequently accompany achondroplasia, the most frequent being a highly vaulted palate, inguinal hernia, epicanthus, and, according to Kassowitz,[21] congenital dislocation of the hip. The internal organs are normal and no pathological changes have, so far, been found in any except bony tissues.

Nothing is known of the etiology of the disease. Syphilis has been held responsible for this as for many other obscure disorders, but there is no trustworthy evidence of any relationship between the two conditions. Hereditary influence has been arraigned, and consanguinity of the parents has also been accused, but the evidence is too slight to condemn either the one or the other. The sexes would seem to be about equally vulnerable, though statistics indicate a slightly increased prevalence among females.

Of the true pathology of achondroplasia little can be said. The old idea that it was closely related to congenital cretinism will not, as has been already stated, bear the light of more recent observation. In Nathan's opinion, "the changes in the skeleton and in the subdermal tissues point very distinctly to a constitutional anomaly, which, though not exactly analagous to that of congenital cretinism, nevertheless acts upon the fetal organism in a similar manner—that is, by disturbing the metabolism in some unknown way." The portion of the base of the skull which Virchow designated the ostribasilare is composed of the basilar process of the occipital bone and the two portions of the body of the sphenoid. In fetal life these three portions are separated by synchondroses, which at birth are only partially ossified. The synchondrosis intersphenoidalis is ossified at birth or soon after, but the synchondrosis spheno-occipitalis remains patent until about the thirteenth year, and complete synostosis does not occur normally until between the eighteenth and twentieth years. The growth of the base of the skull depends upon the persistence of these synchondroses, premature synostosis producing abnormal shortening. According to Kaufmann premature synostosis of the ostribasilare is not the only factor which is responsible for the peculiar physiognomy of achondroplasia. There may be an accompanying shortening of the ethmoid and nasal bones as well, and also a change from normal in the angle formed at the junction of the basilar process of the occipital bone with the body of the sphenoid. The other bones of the skeleton present a variety of changes. In the long bones these occur primarily in the growing cartilage.

Kaufmann distinguishes three types:

(*a*) Chondrodystrophia fetalis hypoplastica, in which the epiphysis is normal in size and consistency; there is inhibition of row formation and also inhibition of proliferation of cartilage cells.

(*b*) Chondrodystrophia fetalis hyperplastica, in which the epiphysis is definitely enlarged and the consistency is variable; there is inhibition of row formation and increased proliferation of cartilage cells.

(*c*) Chondrodsytrophia fetalis malica, in which the cartilage is softened; there is inhibition of row formation and the intercellular substance is gelatinous and very vascular.

In all these varieties the common features is a "more or less complete inhibition of the normal row formation of the proliferating cartilage cells in the preparatory stage of ossification." All three types may be present in one individual, but one usually predominates. Despite this pathological process in the cartilage, calcification proceeds normally, periosteal bone formation is unaltered, and the bones which are formed directly from connective tissue show no abnormality. Urtel first pointed out that, in most cases, the epiphysis and diaphysis become separated by the intervention of a layer of connective tissue emanating from the periosteum. The cause of this periosteal inclusion is not clearly defined, but the most plausible explanation attributes it to an "overgrowth of the epiphysis beyond the peripheral diaphyseal line, causing an involution of the periosteum, which subsequently proliferates." This periosteal invasion interferes with growth in the length of the bone, but only completely arrests it when the inclusion is extensive and undergoes ossification. The prominent differential characteristics of achondroplasia are:

1. A congenital origin.
2. An abnormally large vault to the cranium.
3. Depression of the root of the nose.
4. Prognathus.
5. Arrested development of the long bones of the extremities, with exaggeration of their normal curves.
6. Normal development of the trunk.
7. Beaded ribs and enlargement at the ends of the long bones from diaphyseal and epiphyseal changes.
8. Decentralization of the mid-point of the body, which is invariably and persistently above, and not below, the umbilicus.
9. Characteristic appearance of the hands, described by Marie as the *main-en-trident*.
10. Excess of adipose tissue.
11. Protuberant abdomen.
12. Lordosis.
13. Smooth, pliable skin, with abundance of glossy hair in all the ordinary situations.
14. Normal mental condition.
15. A tendency to other congenital malformations, especially to high-arched palate and inguinal hernia.

The question of differential diagnosis is not difficult. The only conditions with which achondroplasia is likely to be confounded are rickets and cretinism. Its many points of similarity to rickets has suggested to certain writers doubts as to whether there may not be some degree of relationship between the two disorders. A consideration of a few of the points in which they differ from one another will, however, immediately show that such a relationship, if it exists, must be a distant one. In rickets the child is born healthy, in achondroplasia the characteristic de- premature synostosis of the ostribasilare as in achondroplasia, whereas the hypertrophic bosses and atrophic craniotabes which characterize the rickety skull are absent in achondroplasia. The stunning of the long bones, the shape of the hands, the lordosis, the sunken nose, and the abnormally high situation of the mid-point of the body are leading features of achondroplasia, just as the contracted chest, deformed ribs, curved spine, and bowed legs are unmistakable indications of rickets. Dentition and speech are not delayed in achondroplasia as they are in rickets, and the well-known constitutional phenomena which accompany the latter are absent in the former disease. The diagnosis from cretinism is obvious if the child survives infancy, because though it appears healthy when born, the cretin soon betrays evidence of mental feebleness, while, among other differentiating features, it may be noted that the thyroid gland is absent or rudimentary, the skin and hair is coarse and thick, there are fatty pads in the supra clavicular fossæ, the facial expression is vacant, the head hangs forward on the chest, the habits are dirty, and the patient is frequently destructive and vicious.

There is no full description of achondroplasia to be found in the textbooks on medicine, and this account of the disease, which is gathered from the desultory papers of writers to whom reference has been given will be found fully verified by the following report of a case recently admitted to the Royal Waterloo Hospital, under Mr. Pendlebury, for the treatment of an abscess on the right temple, and subsequently transferred to one of the medical beds.

The boy's name is G. G., and he is 9 years of age. There is nothing remarkable in the family history. The mother is a healthy woman and has had a family of three boys, of whom this is the youngest. The eldest is 12 years of age, and is in all respects normal and active. The second child died of "wasting" when 3 years old. This child was born after a normal and unassisted labor, but was misshapen at birth. Apart from his deformities, he appears to have been from the first healthy and vigorous. His mother nursed him for one month, and thereafter he was reared on milk and barley-water. In due course he was sent to school, and he has shown a degree of intelligence so much above the average for a child of his age and class that he has gained two prizes. He is still in the "infants" department and has reached the second standard, but he has been detained in that grade longer than usual from fear of his being annoyed and teased by other boys of his age on account of his diminutive size. He has never suffered from any serious illness, and is now a bright, engaging, and good-tempered child. Most children who are the subjects of achondroplasia are either prematurely or still born, and of those born alive the majority experience precarious health during infancy, though they may subsequently attain normal vigor. In this patient the period of infancy was uneventful. The rickety symptoms which apparently complicate his achondroplasia condition may probably be ascribed to the method of his feeding when a baby. The boy is well nourished, and has a healthy, smooth skin. Two prominent facts at once arrest attention:

1. The size and configuration of the head.
2. The marked asymmetry between the body and the limbs.

The head is abnormally large and disproportionate to the size of the face. The dome of the cranium is high and the occipital region is unduly prominent. The nose is flattened and there is deep retraction of its bridge. The mouth is partially open, and there is pronounced prognathus. The tongue seems somewhat thicker than usual, and its tip can just be seen between the open lips. The teeth are carious. The palate is arched and high. The voice is nasal in quality, but this is probably, in some measures at least, due to the existence of adenoids. Immediately below the right nostril there is a small venous nævus, and there is a rudimentary accessory auricle to the left ear. The trunk is of average size, but presents the following abnormalities: The sternum projects forward, there is a distinct costal rosary, and a well-defined Harrison's sulcus. These features are suggestive of true rickets and indicate either that we have, in this case, to deal with a double condition, or that the two disorders, though clearly defined from one another, are yet, as has been suggested by some authorities, closely related. The abdomen is fat and protuberant, its prominence being, to a considerable extent, the consequence of the lordosis of the spine. Owing to the shortness of the legs the gait is clumsy; it lacks the rolling character of congenital dislocation of the hips which the extreme curvature of the spine at first hints at, but which is at once negatived by examination of the joints. The umbilicus is near the intercristal line; and the mid-point of the body, when measured in the erect position, is immediately below the tip of the ensiform cartilage. There is a general increase of subcutaneous fat, and this obesity causes an accentuation of the natural folds of the skin, which is specially noticeable round the ankle-joints. The arms are thick and short, and in extreme extension barely reach the tips of the great trochanters. All the joints are prominent. The shaft of each humerus is short, being only ⅝ in. longer than the clavicle; the extremities of the bone are large. The bones of the forearm are shortened, and there is a decided increase in the normal curve of the radius.

The hands are remarkably foreshortened, and the fingers taper towards the points and deviate from one another like the spokes of a wheel.

In the legs the features of the arms are reproduced. There is general shortening of the bones, increase in the normal curvatures, and enlargement of the extremities. The longitudinal arch of the foot is destroyed, giving rise to splayness.

The following table of measurements will be found useful for comparison:

	This Case.	Normal Boy of Same Age.
Height	2 ft. 11 in.	3 ft. 10 in.
Height sitting	2 ft. 1 in.	2 ft. 2½ in.
Weight	2 st. 3¾ lb.	3 st. 10 lb.
Circumference of head	20¾ in.	20¾ in.
Tip of mastoid to tip of mastoid	15 in.	14½ in.
Clavicle	4 in.	4¼ in.
Acromion to external condyle	4⅝ in.	8⅛ in.
Radius	3⅝ in.	6 in.
Olecranon to ulnar spine	4¼ in.	6¼ in.
Anterior superior spine to internal mallcolus	7¼ in.	22¼ in.
Internal condyle of tibia to malleolus	5½ in.	9 in.
Chest, full expiration	20½ in.	24¾ in.

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CAVERNOUS SINUS THROMBOSIS IN CHILDREN FOLLOWING MASTOID INFLAMMATION*

By H. Glover Langworthy, M.D.

Before considering thrombosis of the cavernous sinuses in children arising from mastoid disease, attention is first called to their anatomical relations.

The cavernous sinuses, two in number, one on each side of the body of the sphenoid extend from the sphenoidal fissure in front to the apex of the petrous portion of the temporal bone behind. Anteriorly they receive the ophthalmic veins; internally, communicate freely with each other by two and sometimes three smaller circular sinuses partly enclosing the pituitary body and posteriorly, terminate by dividing into the superior and inferior petrosals. They are quite large, divided by fibrous bands and trabeculae into irregular lacunar cavities. An idea of their considerable size may be had when it is understood that the internal carotid artery and sixth nerve pass through the sinus, while contained partly in its outer wall are the third, fourth and opthalmic division of the fifth nerve. On its internal surface the cavernous sinus is separated from the sphenoidal cavity by the thinnest of bony partitions. Sometimes in an anatomical specimen showing very irregular and narrow sphenoidal cavities projecting well laterally the sinus is situated almost directly above one of them. The sinus has tributaries above from the frontal lobes of the brain and below communicates with other veins in the neck, through the foramina ovale, Vesaliis and the cartoid canal.

While this paper deals merely with the picture of thrombosis arising from the temporal bone it is readily inferred from its position that infection is possible from four directions; superiorly and very rarely by traumatic inflammations following the superior longitudinal sinus and cerebral veins; inferiorly by direct caries of the body of the sphenoid and posterior ethmoid cells and through the foreamen ovale from the pharynx; anteriorly and commonly by infective inflammation of the orbit, nose and face passing backward along the ophthalmic veins; lastly and fairly frequently in children by the infection, arising posteriorly from a mastoid focus being carried directly forward against the venous current along the petrosals, usually the superior petrosal. The lateral sinus and internal jugular vein are first effected, the thrombus extending from the lateral into one of the petrosals.

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*Am. Jl. Laryngology, etc.

It seems possible, however, to get a thrombus in the carvernous sinus by way of the petrosals with only a small thrombus in the upper part of the sigmoid curve; or, if the tegmen tympani be badly perforated, the superior petrosal may be directly involved. In caries of the petrous portion, the veins emptying into the inferior petrosals present a not altogether improbable means for extension of further trouble. Sometimes with perforations through the anterior bony canal wall or a line of suppurating cells far forward in the Zygoma, the veins of the deploe passing inwards through the internal table and emptying into the superior petrosal may be the means of infection. Fortunately the lymphatic system does not play a part in this region as, it is now generally agreed, the encephalon and its membranes are without such a system.

Secondary thrombosis of brain sinuses has lately become recognized as more frequent than we had commonly supposed. Often in post-operative mastoid cases which develop sudden temperature and unusual symptoms of prostration and then quickly subside, it would appear as if there must have been some disturbance or partial stasis at a point in the nearest sinus, the current by pure physical force soon being re-established and the moderate inflammation of the wall which led to the phenomenon being overcome by an effort on the part of nature. Where a physical examination, thorough search of the mastoid wound and middle ear, reveals nothing of importance this explanation is tenable.

The usual course of thrombosis of the cavernous sinus arising from acute purulent otitis media in children is as follows:

The patient, a boy of seven let us say, has had no previous ear trouble until five or six days before coming under observation, when he is taken with a sudden severe pain in one ear followed by otorrhea and slight mastoid tenderness. There may have been a decided pneumonia, the middle ear and mastoid soon sharing in the invasion of the pneumococcus. Otorrhea and mastoid edema increase, extending perhaps anterior to the auricle, the swelling involving the region of the parotid gland. Paracentesis, mastoid operation and sponge baths have no effect, the patient growing worse. Slight chills are then noticed and may be quite constant, without convulsions or vomiting. The temperature rises rapidly and in a few days may reach 104° to 105½° F. with an accelerated pulse. The edema anterior to the auricle has now extended forward over the zygoma and side of the face with tenderness along the course of the internal jugular vein.

If the case perhaps be not seen by the aurist until this stage is reached the mastoid is opened, lateral sinus incised, and internal jugular ligated in the neck. In another twenty-four to thirty-six hours the temperature instead of remitting, continues very high and irregular. The pupils are contracted, react sluggishly to light or not at all. The little patient is dull and partly comatose. Optic neuritis is observed. Babinski perhaps on one side. Kernig's sign plus and reflexes lost. Often there is already slight chemosis of the lids and a suggestion of orbital cellulitis on the same side with the swelling of the face and temple. Occasional half involuntary movements of the bowels and transient epileptiform attacks follow.

We know that the prognosis is bad, but are somewhat doubtful as to just what is taking place. Beginning cavernous sinus thrombosis is more compatible with the symptoms than cerebral abscess, multiple extra-dural abscesses or a wholly general purulent meningitis. The patient is delirious, tossing about as if in great pain. There may be slight divergent strabismus, difficulty in swallowing, and a beginning metastic abscess in a distant joint.

Chemosis of the lids and exopthalmos of the eye on the same side with the mastoid soon follow and gradually increase. The orbital cellulitis may become tremendous with sub-periostial abscess or even panophtalmitis. In forty-eight hours chemosis of the lids and exophthalmos of the other eye is sure to follow. The exophthalmos and chemosis of the lids may finally be seen to vary, becoming more marked in first one eye and then in the other, or alternating. Death quickly follows from septic exhaustion, the temperature rising occasionally as high as 107° F.

It is remarkable how long a case so septic will linger, often several days. The whole duration of the sinus disease is rarely over six or seven days.

Pain in and around the eyes during the early stages is usually an unknown quantity, the patient being so young that little information is expected in that direction. Stupor varies with periods of semi-unconsciousness. A study of motor paralysis is difficult on account of the general edema. The lids and whole side of the face have a dusky hue due to venous engorgement. At times ecchymotic areas are seen. The eye is pushed toward the temporal side and the exophthalmos is so great that part of the globe protrudes between the lids. The cornea may show ulceration or a general haziness. In one-half the cases death takes place before the eye is lost. Most authorities report the pupil dilated. In a case where the media remained clear engorgemnt of retinal vessels was not observed. When the second eye is involved the process is at once seen to be independent of the other eye and not to have jumped across the forehead or bridge of the nose.

The diagnosis when the eye symptoms appear together with the known mastoid focus, is easy and there can be but small chance for a mistake. In the ophthalmic cases where the trouble started anteriorly, working back, it would seem next to impossible to be sure of the diagnosis until the second eye showed involvement. There is this to be said, however, that any case of exophthalmos with marked toxic features must be regarded as suspicious.

The condition is to be differentiated from orbital cellulitis and perhaps beginning erysipelas. Septic infection of the frontal sinus is not likely to be met with in a child.

At autopsy there is usually an extensive leptomeningitis at the base. The dura in the immediate neighborhood and along the path of the infection is found thickened and discolored. The brain itself is in a fairly healthy condition. There is marked erosion of the bone everywhere in contact with the cavernous sinus and caries of the roof of the orbits. The staining of the bone is a prominent feature, varying from livid green to black. The body of the sphenoid is sometimes softened to a considerable degree, the bone spaces being infiltrated with pus. Distinct bubbles of gas may escape when an instrument is forced into the necrotic bone. The cavernous sinuses are partly disintegrated. Extra-dural abscess may be present. Both petrosals, lateral sinus and internal jugular vein may all be thrombosed. Extensive caries of either petrous or squamous portions of the temporal bone or perforations through the tegmen tympani and anterior bony canal wall are usually present. There may be marked caries in the region of the jugular bulb. The lungs show, as a rule, pneumonic patches. Cultures show the streptococcus, pneumococcus and occasionally the diplococcus intracellularis.

Why perforations through the anterior bony canal wall of the external auditory meatus should occur so frequently is hard to explain.

In Lodge's[1] case, a woman age 41 years, the process extended from a left peri-tonsillar abscess following the pterygoid plexus. Autopsy showed septic thrombosis of the cavernous sinuses and both sphenoidal sinuses filled with pus.

Dwight and German[2] in one of their cases (adult) in which the process extended from a carbuncle on the back of the neck, report: left lateral, petrosal and both cavernous sinuses thrombosed. All small sinuses around pituitary body were enlarged and filled with pus. Pressure on the eyeball caused pus to be forced out of the orbit, apparently along the track of the ophthalmic veins. There were abscesses in both lungs.

Owing to the scarcity of post-mortem records in cases following mastoid disease, considerable time should be spent in stripping off the dura, examining the dura for inflammation, the veins and sinuses for thrombosis and the bone everywhere for discolorations and necrosis. The orbit, internal ear, neck and lungs should perhaps be given a special examination.

Virchow has aptly said "A post-mortem does not admit of repetition, whereas in a clinical examination at the bedside any omission may ordinarily be rectified at a subsequent visit."

The rational treatment of such a septic condition consists in incising and draining the cavernous sinus directly. If the aural surgeon does not care to make the attempt a general surgeon can always be found who will. Although the cases are apparently moribund, with the full knowledge and consent of the parents an operation should be performed. In a beautiful paper which must be considered classic Dr. Knapp[3] reports this very successful sinus operation by Dr. Frank Hartley following the Gasserian ganglion route. Dr. Knapp mentions that he was able to follow the entire operation closely, one cavernous sinus being clearly seen. I can but quote his conclusions, at a time too, when the disease was more rarely recognized and less fully understood: "The method of osteoplastic resection, in this almost inaccessible neighborhood, simultaneously preached and made known by Hartley and Krause may be applicable not only to the rare cases of aseptic thrombosis of the cavernous sinus, but also to the infectious otogenous thrombosis."

Dwight and Germain clearly demonstrated a month previously that a cranial operation is not associated with extreme difficulty but must be quickly done. The slight hemorrhage in both instances was easily controlled.

In a former paper,[4] a route to the sinus was advanced from work on the cadaver, applicable to the class of cases in which the patients die before the eye is lost. The plan proposed was: to remove the inner wall of the orbit, the nasal bone on that side, and the anterior and thin lateral wall of one sphenoidal cavity against which lies the cavernous sinus. The eye is retracted from the field. With the nasal structures wanting the work is performed in a fairly good light. A portion of the roof might also be opened in the hopes of striking one of the circular sinuses. Using a stout and properly curved curette, chisel and bone punch the sphenoidal wall is first cracked and then removed.

It would almost seem justifiable to introduce a trochar into the sinus in some of the cases, if for no other purpose than diagnosis. A thrombosed sinus will not bleed. Opening one sinus should drain both.

The chief danger encountered is the internal carotid artery. To avoid this, tying off the carotid in the neck before beginning the operation has been suggested.[1]

Enucleation of lost eyes as has been practiced will not drain the sinus. It does seem, however, that with a complete exenteration of the orbit and following the ophthalmic vein backward through the sphenoidal fissure some drainage should be secured. A good part of the apex of the orbit would necessarily have to be chiselled away to accomplish this.

Dr. H. P. Mosher[2] expresses the opinion that this method appears hopeful particularly as the optic nerve is already destroyed and some of the larger nerves paralyzed.

It is to be lamented that the older ophthalmologists who have undoubtedly seen a good many cases have not given the profession the benefit of either their observations or possible experiments.

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The following concluding remarks will perhaps not seem out of place: An examination of the inner or cerebral surface of the base of the skull shows each middle fossa corresponding roughly to an inverted funnel, the apex having several openings, *i.e.,* the sphenoidal fissure, foramen rotundum, foramen ovale, foramen spinosum and the orifice of the carotid canal. The thin walls of the sphenoidal sinus also form a considerable part of the inner lower floor of this funnel. An opening upward through one of these sphenoidal cavities, theoretically, would be a measure to drain not only the cavernous sinus but if followed beyond, the greater part of the entire base of the middle fossa.

The operative plan previously outlined for draining the cavernous sinus is practically outside the dura (sub-dural) and leaves the dura mater and brain substance untouched. A chance for increasing an already existing meningitis by mechanical manipulation in this way might possibly be avoided.

It would seem that if only a small hole be open, pus or semi-clotted blood would eventually find its way out following the natural law of gravity. I see no reason why a concomitant extra-dural abscess if positively located anterior to the petrous portion of the temporal bone, well towards the median line might not also be reached.

It is remarkable the size of the sphenoid sinuses and their openings into the nose. A considerable portion of the inner wall of the orbit can be removed without encroaching on the orbital floor which forms the roof of the maxillary antrum. When once in the nose, with the nasal bone, ethmoid cells and middle turbinate removed, one can hardly miss the sphenoidal cavity. It is impossible to go too far posteriorly as the curette will encounter the thick, hard cellular body of the sphenoid which forms the posterior wall of the sphenoidal sinus.

I do not believe the internal carotid artery will prove such a difficult problem after all as its location is quite far posteriorly, rising abruptly as it runs forward. The location of this artery seems fairly constant.

On one specimen a large dehiscence was noticed opening into the carotid canal. Evidently during life, a layer of fibrous tissue only separated the carotid in the cavernous sinus from the air in the sphenoidal cavity.

I believe the plan of approaching the middle fossa as given will be much better than an attempt to chisel away the apex of the orbit. Whether opening the middle fossa would help a general purulent meningitis in this region is also a problem worth considering.

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VAGINAL SARCOMA IN AN INFANT SEVENTEEN MONTHS OF AGE.

By O. L. Holmes, M.D., Covington, Ga.

The case here reported was first seen on the 17th of June, 1903, having been referred to me for treatment by Dr. A. W. Shaw, of Monticello, Ga.

The following history was elicited from the mother: Parents healthy; child aged 17 months, female; has had no serious illness; in the preceding February had a fall, after which it was fretful; about three weeks after fall noticed that there was a slight, pale, reddish vaginal discharge, and child became very anemic; the discharge increased, and began to have a slight disagreeable odor; slight pain on micturition; bowels inclined to be constipated; about April noticed that there were small masses expelled from vagina after child strained at defecation; had been treated with vaginal douches and tonics with no improvement. The child presented an extreme anemic condition; temperature 101°, pulse 130, and soft; was fretful and had difficulty on micturition, and bearing-down pains on defecation; a mass about the size of a small orange presented itself above symphysis, reaching near the umbilicus, soft and fluctuating; slight vaginal discharge, pinkish in color, and some odor; no vaginal examination made at time; was prepared for operation on the 22d of June; after being anesthetized, a digital examination of vagina attempted. The vagina was found filled with a soft, friable, gelatinous, vascular mass, which curetted away with the finger, and about four to six ounces of a reddish-gray material was removed; some odor. The infantile uterus could be felt, and did not seem to be involved, the tumor apparently springing from the anterior wall of the vagina. After relieving this condition, about four ounces of urine was passed involuntarily, and the abdominal tumor disappeared. The vagina was irrigated with a one to eight thousand permanganate of potash solution, and was packed with iodoform gauze. The child rallied from the anesthetic nicely. The gauze was allowed to remain for three days, when it was removed and was found to be saturated with a sero-bloody discharge. The irrigations were ordered daily, and child placed on tonic treatment. It improved in every respect for about six weeks.

About August the first, the mother noticed that the discharge was returning, and was of a very foul odor, and difficulty of defecation and micturition returning.

It was returned for treatment on the 16th of August, and a second operation was done, and about three ounces of the same character of material removed, only the odor was more offensive. A specimen of this was sent to Dr. Claude Smith, of Atlanta, for a report on it. He reported that it was a specimen of sarcoma of the round cell variety.

Child improved for a short period after the second operation, but soon relapsed and was returned and operated on three different times between the first of September and December, when death resulted.

The growth returned rapidly after each operation; the temperature during the course of trouble was intermittent in character.

The child at the time of death presented a general anasarca and pyemic condition, death resulting from uremia and septicemia. No autopsy allowed.

In connection with this case, I wish to present the reports and discussions of similar cases on record. Most authorities agree that it is of rare occurrence.

Dr. Wrede, in 1903, reported a case in a child, 21 months of age. It had shown at first symptoms of fever and anorexia; later a small cauliflower growth was found protruding from the vagina. It was removed by ligation, but recurred in two weeks. Repeated operation; tumor continued to grow, and finally became associated with cystitis and continued fever before death, which occurred about twelve months after first seen.

It was found to be a round and spindle cell sarcoma.

C. H. Frick, in 1888, reports two cases: First, aged seven months, presented a tumor, pale, smooth, size of walnut; no symptoms of pain, hemorrhage, or discharge. Operation: removal of tumor from right anterior vaginal wall; rapid recurrence and death. Was found to be a round spindle cell sarcoma.

Case 2. Aged two years; tumor size of walnut, originating from posterior vaginal wall near vaginal entrance; operation; recurrence. Second operation, tumor same character as first, that is, cylindrical, round and spindle-shaped cell. Child recovered, and was well three years after second operation.

Piechaud and Guyot, in 1901, reported a case of primary sarcoma in an infant two years of age. Tumor protruded from vagina, and gave rise to serious hemorrhage. Diagnosis of primary sarcoma of vagina. Inoperable on account of size. Autopsy revealed a generalized, suppurating peritonitis to have been direct cause of death. Tumor originated from posterior vaginal wall; anterior wall was congested, without ulceration. Uterus was not connected with tumor.

Dr. Schuchardt, in 1888, cites several cases, two under his care.

(1) Aged 7 months; tumor smooth, pink, hazelnut size, at vulva; grew rapidly; difficulty on micturition and defecation. Tumor removed, composed of button-like polypi like bunch of grapes; microscopical findings, round and spindle cell sarcoma. Child died five months after operation from recurrence.

(2) Aged 2 years and 6 months; had pertussis lasting six to eight weeks. Tumor first noticed at that time. Some pain and hemorrhage. Tumor removed. Microscope showed round and spindle cell sarcoma. Tumor recurred seven months later and was removed again. Tumor same as first. No recurrence when last heard from.

M. Sanger, in 1880, reports a case in a child, 3 years of age. Two pedunculated polypus growths projected from the vulva, the size of small grapes, of soft consistency, and pinkish in color. Tumor apparently attached to left lateral wall of vagina. It was suppurating. Operation: Removal of portions of tumor. Radical operation not advisable. Tumor was a typical round cell sarcoma. Child returned in two months with a recurrence. Result, death.

Autopsy showed general anasarca and anemia. Ascites, accompanied by suppurative peritonitis. Large sarcoma of anterior vaginal wall. Isolated polypi of posterior wall perforating abdominal cavity. Dilation of bladder and ureters.

A. Kolisko reports three cases in 1889: First, aged 18 months, died two weeks after admittance to hospital from polypus, vaginal sarcoma. Autopsy showed anemia of internal organs, nodular tumor of vestibule, infiltrating vagina, urethra, base of bladder and cervix uteri, followed by cystitis, pyelitis and pyelonephritis and pyometra, anemia and sepsis; microscope showed myofibrosarcoma.

Second case. Aged 12 months; tumor protruded from left of vulva; presented a number of large and small polypi. Repeated operation, with rapid recurrence after each; finally, death, about six months after first noticed. Microscope showed round and spindle cell sarcoma. Neoplasm originated in left vaginal wall, infiltrating rectum and vagina. Retention of secretion due to polypi caused pyometritis and suppurative peritonitis, causing death.

Case 3. Aged 18 months, admitted to Billroth's clinic in 1875. Tumor protruding from vulva about one month before admittance. No symptoms for two weeks. Vagina long. Removal. Improved, but vagina became filled with vegetation after operation. Result, death.

Autopsy: Neoplasm originating in anterior vaginal wall. Tumor grew to size of a walnut in six weeks; microscope showed myofibrosarcoma.

Kolisko also gives abstracts of eleven cases of sarcoma in children and concludes his paper, giving his opinion that only early and radical extirpation of primary tumor justifies one to hope for a successful issue.

Dr. A. Power, in 1895-6, reports a case, aged 2 years and four months, admitted to the hospital for retention of urine caused by tense swelling of vagina, said to date from measles, fourteen months previous. Five months before admittance, noticed small polypi projecting from vulva; died with symptoms of uremia.

Autopsy: Tumor projecting from right wall and most prominent in upper part of vagina. Whole mucous membrane of vagina studded with hundreds of polypi, the size of a pea; adjoining organs congested; microscope shows healthy condition of serous and muscular coats of vagina; submucous connective tissue soft and gelatinous, filled with numerous small cells; the denser polypi of vagina are round cell sarcoma with a great deal of fibroid tissue.

He cites 24 cases collected from various sources. They are characterized by formation of numerous polypi, resembling clustered grapes, which arise from the walls of the vagina; malignancy usually local only. Treatment unsatisfactory. Repeated curettings give temporary relief; most cases fatal in from one to two years after onset of symptoms.

Rabe, in 1902, reports a case, six months of age, which had symptoms of intermittent pain, accompanied by frequent and difficult micturition. Upon examination found a tumor, the size of a small nut, reddish in color, at site of vestibule. It involved the urinary meatus. Diagnosis, sarcoma. Removal of uterus and vagina per laparotomy. Death from broncho-pneumonia.

Strassman, in 1899, reports a case, 18 months. Suffered for about four months previous to examination from hemorrhage and foul-smelling discharge from vagina. Pain on micturition; no fever; partly gangrenous tumor was projecting from vagina. Curetted and tamponned with iodoform gauze. Microscope showed large round and spindle cell sarcoma. Proposed to remove vagina and uterus per sacrum. Gives no results.

Dr. A. W. Lee, in 1901, reports a case of primary sarcoma in a child, two and a half years, first seen in 1899. Watery and bloody discharge had been observed for some months previous. Several polypi projected from vulva. Around vaginal and urethral entrance numerous growths of firm consistency.

Elastic tumor felt in abdomen, reaching to umbilicus. Vagina dilated and filled with soft growth. Many pedunculated, recto-vaginal and vesico-vaginal walls involved. Microscopical findings, sarcoma. Died in thirteen months after first seen.

E. H. Starfinger cites a case, reported by Steinthall, of a child, two years; duration of disease, twelve months. Tumor removed after eight months' duration. Recurrence in eight weeks. Death six months later from uremia. Tumor originated from anterior vaginal wall. Microscopical findings, round cell sarcoma.

He also reports a case, aged eighteen months. Duration of disease, six months. First seen in sixth month of disease. Soft, friable tumor occupies whole of posterior vaginal wall. Removal with curette; tamponned. Death in three weeks. Microscope showed large, round and spindle cell sarcoma.

Hesterman cites a number of cases by other authors, among them:

Dr. March. Child, two years and seven months. Tumor on anterior vaginal wall; polypi growth; metastasis on posterior wall of bladder. Course of disease, six months. Operation; seven recurrences; death.

Case by Sathman. Aged two years and six months. Tumor on anterior wall of vagina; base size of a dollar; polypi growth protruding from vagina. Small tumor also in posterior wall of bladder. During course of disease experienced difficulty in walking; painful micturition; intermittent fever, and hemorrhage. Operation; recurrence; death. Microscope: roud cell sarcoma.

Case by Hauser. Child, aged 12 months. Tumor on anterior vaginal wall towards right. Microscope: round spindle cell sarcoma. First symptom at six months of age. Operation; recurrence at short intervals; death.

Dr. B. Brown presented a sarcoma of vagina in a child, three years old, to the Obstetrical Society of Baltimore, and Dr. Kelly, in discussing it, said: "They begin as more or less irregular, flat, sessile tumors in the anterior wall of the vagina. They occur usually in the very young. In two cases tumor appeared to be congenital. They are found in the majority of cases on the anterior wall. They do not spread by metastasis. The metastasis being local, or only a short distance from the area of infection. In another respect they are peculiar, in that they contain straight muscular fibers."

Dr. Munz discusses the occurrence of sarcoma in children and adults and says: "The majority occur between six months and three and a half years. Prognosis grave. Disturbances produced are slight in beginning, but soon become serious. Recurrences always follow operations from several weeks to two months after operation. The recurrent growths have the same character, only they grow more rapidly and degenerate sooner than the primary tumor. Average duration is about twelve months. Treatment is operative always. Life is prolonged, but death finally results."

In addition to the above statements, we may add that they are composed principally of round and spindle-shaped cells.

In closing this paper, I wish to thank Major McCaw, Surgeon-General U. S. Army; Dr. Charles A. Pfender, of the U. S. Army Medical Museum, of Washington, D. C.; Dr. Claude Smith, of Atlanta, Ga., and A. W. Shaw, of Monticello, Ga., and Mr. Lamar, of Covington, for valuable assistance.

The authorities quoted herein will be found on record in the United States Army Medical Museum Library.

SOCIETY PROCEEDINGS

THE SOCIETY FOR THE STUDY OF DISEASE IN CHILDREN.

Meeting held Friday, November 16th, 1906.

Dr. Tyson (Folkestone) in the chair.

Psoriasis in childhood.—This paper was communicated by Dr. James Burnet. The author considers psoriasis may differ in causation in early and adult life, and in children it is never so generalised or so scaly as in the adult. He believes every case of psoriasis in the child is due to rheumatism, and this cause is often overlooked owing to the peculiar manifestations of that disease in the young subject. He has been able to satisfy himself that in the greater number of instances psoriasis is merely a rheumatic manifestation, and he quoted two cases of psoriasis occurring in children who at the same time suffered from rheumatism and chorea. He accordingly treats every case of psoriasis with large doses of salicylate of soda or preferably aspirin. Alkaline baths and tar ointments are useful additional measures.

Drs. Spriggs and Higgs showed a hemiplegia in an epileptic child æt. 4 years, with athetosis of the arm. The hemiplegia was discovered one morning, the child having had a fit during the previous night. The leg improved rapidly, and in two or three months he could get about. In July this year athetosis was present in both arm and leg, and it has persisted to the present time, being much more marked in the arm. There is weakness of the left side of the face and some mental impairment. The athetosis increases during excitement and ceases during sleep.

Congenital division of the clavicle into two parts: a patient, aged 12, was shown by Dr. Spriggs with the above deformity. Each clavicle consists of two pieces about 1½ inches long, connected together by a freely movable joint. At rest the pieces form a wide V with the apex upwards. The shoulders can be brought almost to meet in front. The X-rays showed deficient ossification of the bones; and Dr. Spriggs suggested that the ossification of the membrane bone was absent, and the two fragments represented the ossification of the two pieces of cartilage which take part in the development of the clavicle.

A case of bronchiectasis in a young child was shown by Dr. Whipham. The patient, æt. 2 years and 4 months, showed signs of well marked bronchiectasis chiefly in the base of the right lung. Fingers and toes were clubbed. The condition seemed to be due to bronchitis and pneumonia, which was immediately followed by whooping cough.

Lateral congenital fistulæ in the neck, in a girl, æt. 8½ years, was shown by Mr. Philip Turner. They were situated at the inner border of the sternomastoids, 1½ inches above the clavicle. The sinuses could be felt extending upwards nearly to the angle of the jaw.

A child with a large retro-peritoneal dermoid tumor or teratoma, was brought forward by Mr. Raymond Johnson. The tumor was in the upper left half of the abdomen, and resembled a sarcoma of the kidney. The lumbar spine was curved to the right, and in the left loin were two small fluctuating swellings apparently not connected with the abdominal tumor. A portion of a small cyst was removed and showed the naked eye and microscopic appearances of a dermoid.

Dr. Poynton showed a girl, æt. 7, with edema of the left lower extremity and labium. Three patients with this affection—infantile paralysis—were shown by Dr. George Carpenter. One of them was a boy, æt. 11, with double foot drop of sudden onset; the muscles of the front of the legs gave the R.D. reaction.

Another patient was a girl æt. 3, who suddenly became paraplegic. The muscles of the legs and thighs gave the R.D. reaction. The child also could not raise the head or hold it erect, but she could move it from side to side.

The third patient was a girl, æt. 20 months, whose right leg was paralyzed and the muscles gave the R.D. reaction. The left leg was rigid and its muscles reacted to Faradism, though feebly. The onset was sudden, after an attack of diarrhœa and vomiting.

Syphilitic nephritis in an infant æt. 3 months was shown by Dr. Carpenter. The child was dropsical, the urine albuminous, and contained blood corpuscles and hyaline epithelial and granular cysts. The infant was well nourished, but had chronic snuffles, with nasal mucopurulent discharge and a fading eruption on the buttocks, backs of thighs and calves. It had improved by mercurial treatment.

EDITORIAL

THE HUDDERSFIELD EXPERIMENTS

In our January issue we called notice to this remarkable effort made for the reduction in infant mortality, and are tempted to give in greater detail some of the striking results then achieved, to which we are indebted to our esteemed contemporary, the *Medical Magazine*.

Two years ago, the Mayor of Huddersfield, Mr. Broadbent, promised a birthday gift of £1 to every baby born in the Longwood district who lived to the age of one year. Lately, in demitting office, Mr. Broadbent informed the Town Council of the result, so far, of his experiment. His object, he reminded the Council was not to stimulate maternal affection, but to find out where the babies were, and to see whether by constant watchfulness and advice and help on the part of women workers the rate of mortality could not be reduced. The average infant death rate in Longwood for ten years had been 122 per thousand. Throughout the last two years the conditions had been by no means favorable, and whooping cough and measles had been very prevalent. In the first year 112 babies were born, and of those 107 had actually received the gift he offered. Four of the 112 had died (one from whooping cough) and one had left the district and could not be traced. Counting only four as dead, the mortality figure was 35 per thousand; but counting five, it was 44; or counting six, due to the overlapping of the periods, the figure would be 53. Thus the infantile death rate for the experiment was reduced to less than one-half the average rate; put into percentages the result would be 54, 61 or 69. The reduction was striking, even astounding. There was no selection of babies; they belonged to the well-to-do, the highly paid artisan, and the laborer. None of the mothers resented the trial. The same results, he added, could not be brought about in the central districts until the condition of many of the yards and courts was improved, or, better still, improved out of existence.

These results are certainly, as Mr. Broadbent says, astounding, and it is therefore not so easy to see why, if the infant death rate in Longwood is reduced so greatly, a greater reduction is not apparent in Huddersfield, where the Public Health Union has for nine months been carrying out the system of inspection by ladies. The annual meeting of the Union was held a few months ago, when Mr. Mayor Broadbent remarked that the Union had been formed twelve months ago. They projected at that time the formation of committees in various districts of the borough—committees of ladies, who should take specific charge of the work. They were formed, but the corporation had not gone quite so fast. In October and November last year the corporation completed its work by the appointment of lady health visitors and the literature that was necessary, and in January last the joint work actually commenced. Their organization was a new one—one without precedent or example, penetrating into unknown regions, and he would not have been surprised had they been met by many obstacles and difficulties. He thought he was correct in saying that they had met with very few obstacles, and that the work had gone on with smoothness and effectiveness. They could not work that union by rule of thumb. There had been 1,245 births notified from the health office to the lady superintendents of the various districts in which the borough was divided, and reports showed that 553 of them had been visited. The number of visits had been 1,259 by 49 ladies. They would see that it was not complete—or, in other words, that some children had not been visited; but in spite of that he thought the fact most satisfactory, having regard to the thing being new. Taking one district in the Central Wards, there had been 107 births; 400 visits had been paid to the parents of those children by 10 ladies. In another district in the Central Wards, 126 babies were born and 400 visits had been paid by about seven ladies. In another district at Longwood there were 66 births and 300 visits had been paid.

The Public Health Union during the nine months of its active operation had been doing a very considerable amount of work—more than he would have ventured to predict a year ago. With regard to the general character of the work, the lady visitors had practically always been well received. In a few cases, owing to misunderstanding, they had not been made entirely welcome. It should be clearly understood that the work of the union was to assist, and not to hinder. If help was not required the visits were not renewed, and where it was not appreciated help was not enforced. These were the only sufficient exceptions to show that the visitors were kindly welcomed. The greatness of the work was that if it could only be carried out in a thoroughly systematic and regular way they would establish a precedent. They would put up an entirely new example, and it was not easy to do that. They had 2,000 babies on an average born in Huddersfield per year, and it would be an enormous undertaking which on the face of it looked impossible. He did not wish to frighten them by the magnitude of it. It would mean great personal sacrifice, but when they remembered that they were doing it under the observation of the whole country, who would look at the results critically, it would stimulate them to great efforts. It would be a source of satisfaction to feel that they were doing something towards saving the lives of a few children in Huddersfield. But there was something more behind it. If they did it well in Huddersfield it would be copied elsewhere. The lady visitors would be asked to keep careful accounts of their visits for comparison.

Dr. Moore explained that for the first 28 weeks of the work the infantile mortality figure remained considerably below 100 per 1,000. The average for the preceding 10 years was 139. Those figures, of course, pointed to the fact that the Huddersfield and District Health Union had been making its influence felt where it was wanted—upon the rate amongst infants. Coming to the second portion of the period those splendid results were obliterated, but notwithstanding the sub-tropical weather leading to the inevitable epidemic of infantile diarrhœa, the figures were not altogether unsatisfactory. The infantile mortality figure for so much of the present year as had been completed was somewhere about 140, but he rather thought it fell to amongst the hundred and thirties. There was still more than two months, during which time, if the weather was cold, the figure might drop, and they might find that when the year closed they had reduced the figure below the 10 years' mean rate.

INFANT TETANY AND THE PARATHYROID GLANDS

Of all forms of tetany, the best understood from an etiological standpoint is that which is the result of the removal of goitre. Experiment has shown that this species of tetany is caused, not by the cutting away of the thyroid body itself, but by the simultaneous removal of the parathyroid glands.

With this fact established, the question naturally follows, whether other species of tetany may not also be due to functional disorders of these glands. This question has already been affirmatively answered by M. Peneles, who has published a series of treatises upon tetany, and who claims that functional defects of the parathyroid glands are the cause of every form of tetany; and, very recently, and to the same effect, by M. Chvostek.

Time will show in what measure this belief is justifiable; already Stoltzner brings forward one exception. Infant tetany, he declares, cannot possibly be considered the result of parathyroid defects. This author includes, under the name of infant tetany, the common cases of latent tetany among rickety children, which Heubner better terms spasmophilia. Now, there are noteworthy differences between the clinical symptoms of these two diseases. The muscular contractions, which are the surest sign of infant tetany, are always absent in spasmophilia; as are the trembling, dyspnœa, apathy and coma.

It is likewise noteworthy that the two diseases are dissimilarly affected by the same kind of nourishment. It is well known that, in the case of thyroidectomized animals, a milk diet tends to prevent any appearance of tetany, while a flesh diet aggravates any manifestation of it. On the other hand, spasmophilia symptoms increase in direct proportion to the quantity of cow's milk consumed. Infant tetany and spasmophilia, therefore, are in two respects diametrically opposed.

If there actually exists a species of tetany caused by elision of the parathyroid glands, it will eventually be met with in the case of some young child; but rickety spasmophilia has clearly no connection with these organs. As to whether every species of tetany may be classified in one of the two groups, of infant tetany and rickety spasmophilia, or whether there may be other groups of essentially different species, it would be premature to say. Further investigation is necessary, and, at the outset, should be determined the respective effects of cows' milk and meat bouillion upon the progress of the disease.

ABSTRACTS

Congenital Dislocation of the Hip.—Nathaniel Allison (Journal Mo. State Med. Association, Feb., 1906). The author gives the following summary: Seven double dislocations, 14 hips; four single, 4 hips; total number of hips, 18. Sex—10 girls, 1 boy; single dislocation, 1 right side, 3 left side. Double cases—2 double cases (4 hips). Formation of new acetabulum with stability. Abduction deformity relieved. Result. Great improvement. 1 double case (2 hips). Died of tuberculous meningitis four months after operation. 3 double cases (6 hips). Success. Reposition on both sides with good function. 1 double case (2 hips). Success. One side. Other side transposition. Total, 7 double cases, 14 hips. Single cases—1 single case (1 hip). Success. Reposition. Perfect function. 1 single case (1 hip). Transposition. Improved function. 1 single case (1 hip). Success. Reposition. Perfect function. 1 single case (1 hip). Unknown. Slipped out twice; replaced, present condition unknown. Total, 4 single hips (4 hips). Results: 7 double cases (14 hips); success 7 hips; 4 single cases (4 hips); success 2 hips. Total: Success, 9 hips; transposition, 2 hips; unknown, 1 hip; Osteotomy, 4 hips; died, 2 hips. He concludes that the number of cases beyond aid is very small; that the operation is neither difficult nor dangerous; that the after treatment is long, difficult and subject to disappointment; that an early diagnosis is of the utmost advantage to surgeon and patient.

Spontaneous Cure of Congenital Luxation of the Hip of One Side in Certain Cases.—Froelich (Revue d'Orthopédie, January 1, 1906). In the course of evolution of a simple case of congenital luxation the hip of the opposite is not infrequently observed to have likewise become dislocated at the end of a few months or years. This may occur whether the condition has been left to itself or whether the originally diseased side has been subjected to treatment. The existence of the trouble has been demonstrated by the author even in cases where the previously normal condition of one articulation had been shown by X-ray examination. This phenomenon has been accounted for by various explanations, such as faulty position of the sound sides during treatment of the diseased hip; the femoral head slipping above the posterior cotyloid rim; subacute arthritis referable to gonorrhea or osteomyelitis, etc.; also dry infantile arthritis of the hip-joint. If these conditions may be termed almost commonplace, this is not true for the opposite observation, namely, the spontaneous cure of congenital luxation of one side, in cases of double luxation. This was observed to be the case in two patients of the author's, little girls of five and seven years of age, respectively. Here it was found by clinical examination, verified by the X-ray picture, that one of the coxo-femoral articulations was healthy. The gait of the children was that characteristic of unilateral luxation. However, another set of X-ray pictures taken when the children were two years old (one three years and the other five years previously), showed in an indisputable and incontrovertible fashion that a double congenital dislocation had been originally present. The afterwards healthy side was likewise dislocated, in the first case a little less than the side where the lesion persisted; whereas, in the second case, the luxation was equally marked on both sides.

The explanation of this spontaneous cure of one luxation, side by side with persistence and increased deformity on the other side, lies in the possible effects of the treatment of the opposite hip upon an as yet normally placed femoral head. Forcible abduction favors the passage of the femoral head above the posterior cotyloid rim. It is readily understood that the opposite effect is produced by abduction, which favors the slipping of the head downwards and inwards. As a matter of fact, in both these observations, the luxated leg was in adduction; and in walking, the opposite leg was forcibly abducted so as to adjust and equalize the two lower limbs. In both these cases of originally double luxation, the deformity developed more rapidly on one side, and the leg of this side took on the position of adduction. The opposite leg was forced to place itself in abduction; and since the femoral head had not yet slipped far away from the cotyloid cavity, it was progressively replaced therein by walking and muscular contraction. In both these cases nature accomplished spontaneously the work done by the surgeon in the cure of congenital luxation of the hip-joint when he places the luxated leg in forcible abduction.

Similar cases of spontaneous cure of congenital hip-joint dislocation have been observed by Kirmisson and by Ollier, but without the anatomical confirmation of the clinical findings by the X-ray pictures.

Ideas of Grandeur in General Paralysis of Youth.—Babonneix (Rev. Mens. des Mal. de l'Enf., March, 1906, p. 97). The author commences an interesting paper by quoting the opinion expressed in 1853 by Lasègue, "General paralysis is a disease of adults and of the middle period of life," and quotes the cases occurring at an early age since 1877 with a critical analysis of them. In its broad lines this disease at an early age resembles that of the adult, having the same specific and neuropathic heredity, the same lesions, symptoms, and evolution, but the author establishes certain fundamental distinctions between them: (1) The ideas of grandeur, without being frequent, are not so exceptional as is generally believed, being marked in 12 to 14 per cent. of the cases. (2) They take their principal characteristics from the age of the child, being childish ideas of grandeur. (3) Except in general paralysis they are hardly ever observed before the age of twenty in early dementia.

A Case of Oppenheim's Congenital Muscular Atony.—Jovane (La Pediat., March, 1906, p. 190). A male child, aged 3 months. Parents healthy; no history of tubercle, syphilis, malaria, alcoholism, or hereditary neuropathy in any member of family. The mother had not suffered in any way during gestation. Appearance at birth healthy, except that the limbs were flaccid and motionless, and the head rolled from side to side. On admission at the clinic at Naples nutrition was excellent and nothing abnormal was found except the state of immobility in which the child lay in its mother's arms. The lower limbs were in a state of flaccid paralysis, the upper limbs less so, slight movements of flexion being obtained from repeated stimulation. The head rolled according to the position of the body. In the sitting posture the back curved with the concavity anterior, the head bent on the chest. The auxiliary muscles of respiration were evidently paralyzed, there being an inspiratory retraction of the thorax in front at the point of the insertion of the diaphragm. The state of nutrition of the paralyzed muscles and of the paniculus adiposus was perfectly normal, cutaneous sensibility was intact. Cremasteric and abdominal reflexes normal. Tendon reflexes everywhere abolished, as was also the plantar reflex. Pupils acted normally. The galvanic reaction in the upper limbs, as in the lower, was rather weak, and faradic reaction still more feeble. The case seems one of myatonia (Oppenheim) or congenital muscular atony (Berti). Death occurred from broncho-pneumonia at the age of five months.

Habitual Constipation in Children.—Concetti (Riv. di Clin., Pediat., April, 1906). The author divides the causes into three groups—(1) Alimentary. This may be caused by scantiness of milk; the child passes little urine, takes the breast greedily, and does not thrive. The best method of ascertaining this is to weigh before suckling and fifteen to twenty minutes afterwards. The remedy consists in another nurse or mixed feeding. At other times the child passes much urine and is satisfied with suckling, but does not thrive; in such a case the milk is sufficient in quantity but not in quality. The same happens in artificial feeding when the dilution of the milk and the relation of its various constituents is not maintained as under normal conditions. To correct these errors it is sometimes sufficient to add a teaspoonful of some diastased food, such as Mellin's, to each bottle. After the fifth month barley, cream, or butter may be added. Constipation may be caused by vomiting produced by the bad habit of rocking the child after feeding, or by pyloric stenosis, which the author considers due in the great majority of cases to spasm caused by the introduction of too much food, which irritates the mucous membrane, and with reflex spasm simulating true stenosis and the sensation of a pyloric tumour. Older children suffer from constipation from their diet being limited to milk, eggs, and meat. (2) Functional, due to diminution in activity of the intestinal muscles and nervous system, the latter beng either local or general. All inflammations of the intestinal mucosa may cause paresis of the muscular coat, with constipation and meteorism. In some cases it is connected with acute general infection, specially measles, at other times with drugs, opium, lead, tannin, etc. Such cases are treated by a vegetable and fruit diet and the use of massage, cold packs, and electricity, some laxative, as rhubarb, senna, or magnesia. (3) Anatomical. Occlusion of anus or rectum, narrowing of the digestive tube, congenital or acquired (syphilitic and typhoid cicatrices) anal fissures. A very frequent cause in early infancy is excessive length of the large intestine, which only disappears with increasing years. Congenital megacolon is also a cause not often recognized.

Salicylate Poisoning in Children.—Langmead (Lancet). The author analyzes 8 cases, which make it evident that there is a great variation in the amount required to produce toxic symptoms, some children being poisoned with small doses, others with unusually large doses. The time to use the drug most cautiously is at the beginning of its administration, so that the personal factor may be estimated and any idiosyncrasy detected. The fact that all the patients were constipated before the onset of the symptom indicates clearly that the bowels must be kept well open while the salicylate is being given. The general similarity of the symptoms to those of diabetic coma suggests the giving of bicarbonate of sodium as a prophylactic and remedial measure. Langmead summarizes his paper as follows: 1. Salicylate of sodium sometimes causes in children symptoms resembling the acid poisoning of diabetes.

2. The toxic dose is variable, depending on the idiosyncrasy of the patient and the presence or absence of constipation. 3. Acetone may be detected in the urine and in the breath, its presence constituting one of the first symptoms of the poisoning and affording a valuable danger signal. 4. Treatment should be directed to keeping the acidity of the urine low and the bowels opened in cases of patients taking this drug. 5. If acetone is found or the urine gets more and more strongly acid, the salicylate should be omitted and alkali given alone.

Ocular Eczema in Children.—Krauss (N. Y. Med. Jour.). According to Krauss, ocular eczema is a disease common in childhood, forming 21 per cent. of all eye diseases in children under 16 years. It is most common at the age of 2 years, becoming less frequent as the age advances. It is endemic, but especially prevalent during the months of May, June and April, in the order named. Treatment is very important in modifying its progress and tendency to relapse, and should comprise general treatment with attention to diet and hygiene, as well as local treatment for the eye; the severer and stubborn cases quickly improve when rest in bed is required of the patient.

Thumb-Sucking.—Webb (N. Y. Med. Jour.). Webb describes an ingenious method for overcoming this habit in infants. Taking an appropriately sized thin rubber ball, an oval hole is cut to loosely fit the wrist, and the surface ventilated by very numerous punches with a stable harness punch. A cheesecloth bag is sewed on to the oval hole and a tape run in and out of the cloth at this aperture, which can be gently tied at the wrist. A woolen mitten can be worn within this if required for cold weather. Several sizes have to be made at intervals of two months to allow for growth. For half hour night and morning these are removed and the child taught gradually to pat-a-cake and play with her own hands. After four months the child will be completely broken of the habit, but still must wear them at night as a precautionary measure.

Our Children and Tuberculosis.—Sir James Grant (Mont. Med. Journ., May, 1906). The author speaks of the great importance of the health of children and their environment during the period of school life. The systematic examination of 338 school children by H. Greenwood, Medical Officer of Health for Blackburn, shows that 54 were suffering from tuberculous disease. This teaches the importance of careful periodic inspection of school children and an inquiry into the standard of living in the residences of those diagnosed as consumptives. A trained nurse can teach the principles of isolation, disinfection, and proper feeding. It is important that no child should work at an industry till after the age of twelve years. In New York children of six, seven, and eight are working in cellars and garrets, sewing, making artificial flowers, etc., and it is estimated that in the Republic fully two million of children under sixteen are earning their own living.

Chorea in a Child Aged Two Years.—MACKENZIE (Antiseptic, May, 1906). The author reports a case of a female child, aged 2 years, of nervous heredity who in June had an attack of subacute rheumatism followed by a cardiac lesion: the following month there was a recrudescence of the rheumatism, and a week later choreiform movements began, chiefly in the muscles of the head, neck, and arms. The chorea lasted a month, during which time she was treated with bromides and dialysed iron. The chief point of interest is the tender age of the patient, this disease being rare under five years of age.

Tuberculosis of the Tonsils and Lymphatic Glands, Together with Congenital Bronchiectasis, Cirrhosis of the Liver and Pancreas.—FORBES (Lancet, December 9, 1905). The author read an account of a very interesting case at the Pathological Society on December 5. The patient was aged 2 years and 2 months. For ten days there were swellings in the neck and enlargement of the abdomen. On admission to hospital there was marked swelling of the cervical, post-auricular, axillary, and inguinal glands. The tonsils were swollen and ulcerated. No sign of cardiac or pulmonary disease was detected. The liver was enlarged, extending to the umbilicus. The spleen was also somewhat enlarged. The blood examination showed some anemia and considerable polymorphonuclear leucocytosis. The child had slight rickets, but showed no evidence of congenital syphilis, nor could any history of syphilis be obtained from the parents. The tonsils were removed and showed, on microscopical examination, typical tubercle. The temperature was raised irregularly. Diarrhea and vomiting occurred. The glands diminished in size, but the condition of the abdomen remained the same. Death occurred after six weeks in hospital. At the necropsy there were found tuberculosis of the cervical, mediastinal, bronchial, and mesenteric glands, congenital bronchiectasis of both lungs, and well-marked honeycomb appearance. The liver was much enlarged and weighed 34¼ oz., fairly smooth surface, thickened capsule, greenish-white in color, with extensive fibrosis on section. The pancreas showed similar cirrhotic changes. There was no trace of tubercle in the liver, pancreas, or lungs, which was confined entirely to the affected glands.

Spirochetae in Congenital Syphilis.—REISCHAUER (Deutsch. Med. Wochens., 1905, No. 34). The author examined the stillborn child of a syphilitic mother, and found in smear-preparations of the spleen, liver, and lung typical spirachetæ, none in the kidneys or the blood. Especially easy of detection were they in the liver. This organ showed histologically diffuse hyperplasia of the connective-tissue with corresponding diminution of the liver cells. Stained sections failed to show the organism.

Oxyuris in the Intestinal Wall.—WAGNER (Deutsch. Arch. f. klin. Med., Vol. lxxxi., Nos. 3 and 4). During the autopsy on the body of a five-year-old child, which had succumbed to an acute attack of scarlatina, Wagner found in three Peyer's plaques about fifteen to twenty small nodules of about the size of a pin's head. They were globular and greyish-white in color and felt like grains of sand. Microscopically they were found to consist of lime in which several specimens of oxyuris vermicularis were imbedded. Wagner believes that on coming into contact with the diseased and superficially eroded follicles of the plaques the young oxyurides penetrated into the deeper tissues, where they were eventually enclosed in the healing process and surrounded by a calcareous envelope.

Schoolgirls and Corsets.—LANGE (Münch. Med. Woch). Lange does not approve of bearing all the weight of the clothes on the shoulders, and he thinks that growing girls need some kind of a support for their back. He thinks that he has realized the desired results with a short corset suspended loosely from the shoulders, cut out below the bust and curving upward in front so as to leave the stomach region free. The principle is the same as in men's clothing. The ends of the corset waist cross in the back and button at the sides, and the skirts button to the corset. The stockings are held up by a separate loose belt, bringing the weight on the trochanter, the posterior superior spine, and the symphysis, with the straps on the front of the thigh.

Congenital Hypertrophy of Pylorus.—ROB (Lancet). The line of treatment adopted by Rob in this case was that of washing out the stomach every day and feeding the baby on peptonized milk (1 part) and water (2 parts), in amounts of half an ounce every hour. The child improved steadily under this treatment and an operation is unnecessary. The food was changed, both as to kind and amount, so as to be in keeping with the needs of the patient and the capacity of the stomach and its ability to take care of the food.

Operative Treatment of Infantile Paralysis.—Taylor (N. Y. Med. Jourl.). Taylor advocates the early use of braces, and, in fact, the use of braces in all cases of infantile paralysis in which the lost balance of power or the effect of gravity may lead to distortion, with or without surgical intervention. Neuroplasty, he thinks, can do no harm if conservatively done. If good coaptation is obtained positive results may be expected after three months. These results improve progressively. In two cases reported by Taylor, neuroplasty was performed with comparatively good results. In one case there was a distinct gain in power after 92 days; in this case, however, the paralysis had existed only a few years. In the other case the disease was of ten years' standing. One hundred and twenty days after the operation the patient was able to abduct slightly and flex the foot dorsally and to extend the toes.

Tuberculous Meningitis in Infants—Somnolent Form.—Lesage (La. Clin. Infant., 1906, No. 4, p. 114). The author, in a communication to the Société des Hôpitaux, accurately describes this form. After a prodromal stage, more or less marked, characterized by slight disturbances of nutrition and symptoms of gastroenteritis, the meningitis makes its appearance as an attack of sleepiness; then the infant remains drowsy for hours, the eyes fixed, with half-closed eyelids; the pulse is irregular, the body-weight decreases, and in four to eight days, rarely longer, the torpor gives way to coma, and death ensues. The above constitute the essential clinical signs of the disease. In order to complete the picture it must be remembered that very frequently the infant is at the breast or bottle-fed, and has unusual symptoms of gastric irritability, milk being persistently rejected. The vomiting stage lasts eight to ten days or more, and is hardly ever attributed to meningitis, being a symptom of such common occurrence, and it is only when somnolence shows itself that the possibility of a cerebral affection suggests itself. In the twenty-five cases studied by the author the cerebro-spinal fluid was always clear. The cytological formula in twenty-four cases was that of subacute meningitis—marked mononucleosis (82 to 94 per 100). In general the elements are less numerous than in the meningitis of adults, but the cellular concentration of cerebro-spinal fluid is subject to great variations. On one occasion only was there found a turbid fluid with marked polynucleosis (73 per 100), and this was a case of meningitis associated with Weichselbaum's diplococcus. Koch's bacillus was found by centrifugation in seven instances; in the other cases the result was negative. Similar to facts recorded by Widal and Le Sourd, the virulence of the cerebro-spinal fluid was very marked.

The Diagnostic Significance and Therapeutic Value of Lumbar Puncture in Infantile Tubercular Meningitis.—Cozzolino ('Riv. di clin. Pediat.,' February, 1906). The author, after a careful study of eleven cases, arrives at the following conclusions: (1) Cytological examination of the cerebrospinal fluid in infantile tubercular meningitis is a useful diagnostic aid, but has not the pathognomonic value attributed to it by Vidal and Ravant. (2) Polynucleosis is not an infrequent occurrence in basic meningitis; it may be found not only when Koch's bacilli are present (Concetti), but also when they are absent (Comba-Cozzolino) or when they are found in small numbers (Comba); in the two latter instances, however, the polynucleosis is much less marked. (3) Polynucleosis being found two to four days before the death of the patient cannot be ascribed to that event as stated by Torday and Berthier. (4) In every case, especially in those where it gives a doubtful or unexpected result, cytological examination must be taken in conjunction with other diagnostic signs, such as the formation and appearance of the reticulum, the quantity of albumin, the presence of substances which reduce copper salts, and inoculation into animals. (5) The force with which the fluid issues has only a relative diagnostic value. (6) Concerning the therapeutic value of lumbar puncture, the author agrees in the main with Concetti and Marfan, that in rare instances only it affords a slight and transient relief to the symptoms. In one of the cases the marked improvement noticed after the fourth puncture must probably be attributed to the tubercular antitoxin injected into the spinal canal. (7) Lumbar puncture is therefore indicated in tubercular meningitis as a diagnostic method in doubtful cases, and although usually harmless, it may at times, as Concetti asserts, hasten the course of the illness to a fatal termination.

Persistent Vomiting in an Infant.—Hall ('Dom. Med. Monthly,' March, 1906). The author relates the case of an infant who, though most carefully fed, vomited all nourishment within ten minutes after feeding. At seven months it weighed the same as at birth. Pyloric obstruction was diagnosed and posterior gastro-enterostomy performed, and the stomach was found to be normal in size, but with the muscular coat well developed; no thickening of the pylorus; the transverse colon was greatly distended and the intestines absolutely empty. The child lived twenty-four hours. At the necropsy a plug of mucus was found obstructing the pyloric opening, the lumen of which was 35 centimeters. This was considered to be a case of catarrhal gastritis, with exudation of mucus sufficient to obstruct the outlet, and this obstruction was evidently of some standing, as there was not a vestige of food in the bowels. Hall says such cases are not infrequent and cannot be differentiated from congenital atresia, except, perhaps, that gastric lavage might be of some avail.

Renal Adeno-sarcoma.—Jones ('Arch. of Pediat.,' 1906, Vol. XXIII, p. 282). The author reports a bilateral case of congenital origin in a male infant, aged 7 months, weighing 19½ pounds. The tumors were discovered one month previously, when the child was taken to a doctor for some slight bowel trouble. According to the mother the abdomen had been large since birth, but there had been no symptoms. When examined at seven months of age large tumors were found in each iliac fossa and the testes were undescended. The recti-muscles were separated about two inches, and the abdominal veins were distended. The urine contained a heavy cloud of albumin and a few leucocytes. Death resulted from shock after an exploratory incision. The tumor on the right side weighed 24½ ounces, the left one 26 ounces. The kidney on each side was flattened and superimposed on the tumor. Microscopically, the tumors were composed of dense connective tissue; muscle-fibers, mainly striated; masses of round and spindle-shaped cells, epithelial tumors, and large areas of myxomatous degeneration.

Cystic Kidneys.—Holt ('Arch. of Pediat.,' 1906, Vol. XXIII, p. 321). In a child, dying at fourteen months, multiple abdominal tumors were found to be due to cystic kidneys, with double hydronephrosis, great dilatation of the ureters, and hypertrophy of the bladder. At birth he had a very large abdomen, "like an alderman's," and "lumps" were present. At three months sarcoma of the kidneys was diagnosed. At six months he weighed 14 lbs. 7 ozs., was pale and cachectic, suffering with diarrhœa. Three lumps were felt in both lumbar regions and right iliac region. The entero-colitis was cured in three weeks, and he was discharged from hospital with abdominal condition unaltered. Two months later he was re-admitted for alimentary trouble. Urine amounted to 9 ozs. in twenty-four hours; pale amber color, slightly cloudy; sp. gr. 1004; no albumin or casts. At eleven months he weighed 18 lbs. and appeared very healthy. The lumbar tumors were less globular in shape, sharply defined, but of irregular shape, firm, hard, and slightly movable, with absence of resonance. Death resulted after two weeks' illness characterized by fever, vomiting, constipation, anorexia, abdominal pain, and tenderness. The urine, five days before death, was pale yellow, alkaline, somewhat cloudy, and contained a trace of albumin, a few hyaline casts, a few red cells, and numerous pus cells. Three days later there were more pus, albumin, and cocci. Leucocytosis had increased from 21,000 to 23,000. Autopsy: Left kidney was represented by a large, lobulated, cystic tumor, 16 cm. long, with a shell-like cortex. The ureter was larger than the colon and 7 cm. in circumference at its entrance into the bladder. It was elongated, tortuous, and convoluted, resembling a distended small intestine. Right kidney showed less advanced cystic change and was 12 cm. long, with a thin cortex of renal tissue. The ureter was about two-thirds the size of that on the left side and convoluted in the same way. The bladder formed the iliohypogastric tumor. Its walls were more than 1 cm. in thickness. There was no obstruction in the urinary passages. No peritonitis was found. Holt had seen a similar condition in a child dying of marasmus at one month, with the same absence of obstruction to the flow of urine. Yet the pathological condition points strongly to some such obstruction present in intra-uterine life. Death seemed due to infection of the left kidney, converting the hydronephrosis into pyonephrosis. In one reported case the child lived, with double hydronephrosis, to four years of age. The etiology is very obscure.

Lipomatosis.—Sobel ('Arch. of Pediat.,' 1906, Vol. XXIII, p. 335). Sobel describes a case of universal lipomatosis in a male infant, aged 11 weeks, of Jewish extraction. The first child was healthy. The second developed fat accumulation and enlargement of the head in the fourth week of life and died, after becoming blind, at the age of eight months from broncho-pneumonia and amaurotic idiocy. There was no family history of obesity, goitre, or syphilis. The parents were first cousins. The baby was breast-fed, and undue fulness of the cheeks was noticed in the fifth week of life. After that lipomatosis rapidly became general. The child became less sensitive to its surroundings, and the mother thought it blind. When he came under notice his appearance was that of a miniature fat man, and he weighed 14 lbs. One week later he died, probably from pulmonary edema. It was noticeable that throughout the head could be held erect, presumptive evidence against amaurotic idiocy. Partial or total blindness is not uncommon in lipomatosis, infantilism, and allied conditions. A weight of 14 lbs. is not unusual at eleven weeks old, but in this case the size of the head and the body length were only those of a new-born infant.

Acute Circumscribed Edema.—A. D. SMITH AND F. S. MEARA ('Arch. of Pediat.,' 1906, Vol. XXIII, p. 361). The authors summarize our knowledge of the peculiar affection described as urticaria tuberosa, giant swelling, periodic swelling, angio-neurotic edema, etc., and report a case in an infant, aged one year. The attack was ascribed to a meal of cabbage and potatoes which was followed on the next day by a "pimple with red circle round it." Early the following morning the left leg, up to the groin, was found swollen "as if it would burst." This condition lasted one day. In succession the left upper limb, right upper limb, and the right lower limb were similarly affected. Then massive swellings appeared over the parietals, occiput, chest, and abdomen, and micturition was scanty or absent. The swellings were hot to the touch, but did not pit on pressure. Practically the whole body was affected during the course of the disease, except the viscera. The child was put on a diet of barley water and given calomel. Recovery ensued.

Chronic Constipation.—SHEFFIELD ('Arch. of Pediat.,' 1905, Vol. XXII, p. 806). The author ascribes to chronic constipation symptoms such as flatulence, anorexia, headache, restlessness, convulsions, proctitis, anal fissure, rectal prolapse, and piles. Apart from anatomical conditions, the main causes are faulty diet, atony of the bowels, and constitutional disturbance. Preventive measures are of great importance. A regular daily habit must be cultivated. Fat and water are important elements in the diet. In atony of the bowels recourse should be had to massage, oil enemas, hydrotherapy and electricity, galvanic or faradic, applied over different parts of the abdominal wall. If drug treatment is required, some of the following remedies may be used: soap and glycerine suppositories; medicated cocoa butter suppositories (with aloin and belladonna in spastic and nux vomica in atonic cases); enemas with small quantities of glycerine or larger quantities of soap water; internally, magnesia usta, magnesia and rhubarb, compound liquorice powder, castor oil, cascara sagrada, calomel, followed by a mild saline aperient, and, in older children, the mineral salts or waters. Exodin is also recommended as tasteless, and efficient in doses of three to ten grains without causing any intestinal disturbance. The squatting position at stool should be adopted.

A Contribution to the Study of Myxedema.—HEYN (Arch. für Psychiatrie, 51, 1906). The author discusses twelve cases of infantile myxedema, seven of which were severe, and the remaining five relatively mild. The patients were almost exclusively little girls. The majority were committed to the asylum as hopeless idiots, presenting deformities of the head, drooping eyelids, a swollen and protruded tongue, scaly pachyderma of the skull, scanty and coarse hair, thickened skin of the face with deep folds and furrows, a senile appearance, an undersized body, with shortened and curved bones of the extremities, marked curvatures of the spinal column, and large, claw-like hands incapable of the finer movements. The thyroid gland was absent on palpation. Intestinal disturbances were almost invariably present. The patients were mentally apathetic, remaining motionless in the same place, and hardly objecting to the prick of a needle. Instead of speech there were grunting and whining sounds. The children were unable to understand spoken directions addressed to them, and would barely eat on being fed. There was no control of the bladder or rectum. In two typical cases, and two of the less typical ones, the patients died. In the former the thyroid gland was entirely absent. The hypothysis did not present any peculiarities. Death occurred as the result of intercurrent disease.

All these patients, notably in two cases, were considerably improved both psychically and somatically by the following treatment: In the first place, general dietetics in shape of milk or vegetable food; then iodine (Ki) in view of the frequently probable syphilitic origin of the trouble, then thyro-iodine in tablets of 0, 1, beginning with one tablet every other day, then one or two tablets daily. Arsenic was administered in the presence of undesirable side effects. Albuminous substances containing phosphorus were likewise introduced into the system.

Therapeutics of Functional Enuresis.—TH. ZANGGER. ('Korresp. f. Schweizer Arzte, 1905, Nos. 17 and 18). The author gives the following résumé of therapeutical measures: (1) Instruction of the parents and guardians of the child. Special stress is laid upon the gaining of the confidence of the child and upon stimulation of his amour propre; derision, contempt, and severe punishment are to be absolutely avoided. His whole education should be directed towards strengthening the power of will. (2) Diet and regimen. A daily evacuation of the bowels is to be insured; boiled or raw fruit (apples, pears, oranges, dates, figs, etc.) for breakfast and lunch will often be found sufficient. (3) Absolute abstention from fluids after 4 P. M. (4) The food should be sufficient and bland in character, meat, eggs, milk, vegetables, and fruit to be the chief items; condiments and salty articles of diet are to be avoided. (5) A hard bed, not too warm covering at night and a lateral cubitus are to be aimed at. The pelvis should be raised by lifting the end of the bed. (6) The child should be wakened twice during the night and made to urinate. (7) Hydrotherapeutics. A cold tub in the morning followed by a short and cold douche to the back. (8) Combined massage of the sphincters according to Thure Brandt.

Ulcerative Laryngitis with Chondritis of the Cricoid Cartilage.—Deguy and Detot. ('Rev. Mens. des Mal. de l'Enf.,'). The case was that of a child aged 7 years. The illness began on March 18 with coryza and hoarseness, urgent dyspnœa on March 21 demanding intubation; no diphtheria or faucial inflammation, frequent cough and abundant muco-purulent blood-streaked expectoration, slight fever. No tubercle bacilli found on repeated examination. On March 23 there was a sudden attack of dyspnea relieved by removing the tube; the child now remained fairly comfortable; the cough and expectoration persisted, the voice was affected, and the temperature oscillated at about 100.5° F. On March 30 another attack of dyspnea occurred. Intubation was performed but gave incomplete relief; there was some swelling in front of the larynx, which was incised under the belief that there might be a juxtalaryngeal abscess, but no pus was found. The tube was coughed out in the night, replaced in the morning, but ejected again. A worse attack occurred the next night, and the child died in spite of intubation, tracheotomy, and artificial respiration. Post-mortem the mucous membrane was completely destroyed at the level of the cricoid, the posterior part of the cartilage was laid bare, and its inner surface was necrosed. A dense layer of leptothrix coated the cartilage and penetrated for a short distance into its substance. Streptococci were plentiful, especially on the edge of what remained of the mucous membrane, where they formed a regular emulsion.

The Importance of Routine Examination of the Middle Ear in Young Children.—Danziger. ('New York Med. Journ.,'). The author asserts, in a thoroughly original paper, that the middle ear in infants and young children is specially liable to be the seat of disease owing to its anatomical structure and framework. At birth it contains a gelatinous substance and a delicate serous membrane, which readily becomes inflamed. The amount of lymphoid tissue in the pharyngeal mucous membrane must also be borne in mind, as well as the fact that the lumen of the Eustachian tube is very narrow and easily becomes occluded. In middle-ear disease in children the discharge contains the pneumococcus in the majority of cases. He insists that the middle ear, under these circumstances, should be examined more carefully and more frequently in the case of infants and quite young children than it is at present.

Diphtheria at the Hôpital des Enfants Malades.—MARFAN AND LE PLAY. ('Bull. et Mem de la Soc. Med. des Hôp. de Paris,' Dec. 8, 1905). Seven hundred and forty-nine children were admitted to the diphtheria block at the Hôpital des Enfants Malades during the year ending May, 1905. 561 were found to have diphtheria. Of these, 43 died, a mortality of 7.66 per cent. On subtracting 13 who died in less than twenty-four hours after admission, the mortality was reduced to 5.47. The number of admissions and mortality had been considerably higher in previous years. The reduced mortality is probably due to systematic prophylactic injection. 671 such injections were given between July, 1904, and July, 1905, to the brothers and sisters of the patients, none of whom subsequently contracted diphtheria. The low death rate is to be attributed to the scarcity of malignant cases in accordance with Marfan's law that since the employment of serum the mortality in diphtheria depends above all upon the frequency of malignant faucial cases, and no longer, as in pre-antitoxin days, on the number of laryngeal cases and the frequency of surgical intervention required in such cases. 382 of the cases were laryngeal, 29 died, a mortality of 7.5 per cent. 203 of these cases were intubated, only 7 tracheotomised, 27 died, a mortality of 12.85 per cent. Apart from bucco-pharyngeal irrigation used in ulcerating or necrotic forms, Marfan entirely dispensed with local treatment in faucial cases. In malignant forms subcutaneous injection of iodised oil, strychnine, sparteine, or caffeine was employed, or friction with collargol, but the results were not encouraging. The steam chamber hitherto used for the cases of croup and broncho-pneumonia has been discarded this year without bad effects. Instructive tables are given of monthly admissions and deaths, errors of diagnosis, of the serum complications, and of the mortality from intubation and tracheotomy at various ages.

Intubation of the Larynx in Cases of Piphtheric Dyspnea.—G. B. McCaul (The Dublin Journal of Medical Science, May, 1906) gives the following advantages of intubation: (1) Great diminution in the mortality compared with tracheotomy, especially during the first three years of life. After the sixth year tracheotomy is usually preferable. (2) The absence of a wound in the neck. (3) The rapidity with which it can be performed. (4) The slight danger of subsequent pneumonia. (5) The ease of performance compared with tracheotomy. (6) The small amount of subsequent care required. The disadvantages of this operation are: (1) Risk of dislodgment of the false membrane by the tube while being inserted with danger of suffocation before tracheotomy could be performed. (2) Danger that the tube may be coughed up and asphyxia result before it could be replaced. (3) Difficulty of removing the detached membrane through the tube. (4) If pneumonia develops it is impossible to keep the tube free from the viscid secretions which thus increase the dyspnea.

Trachoma in Children.—Bradley (Medical Record, Feb. 3, 1906). Bradley says that the soft follicular trachoma, seen daily in New York school children, is often very difficult to distinguish from follicular conjunctivitis. His rule is to classify as follicular conjunctivitis those cases in which the follicles are limited to the lower lids. In these cases they are lightly scattered over the lids in rows and are superficial. When, however, these same benign follicles appear on the upper lids, even without deep infiltration of the conjunctival tissue, the case should be classed as trachoma. Cases that respond to mild astringents in a short time, or to fresh air, better food, and to relief from errors of refraction are cases of follicular conjunctivitis. Where there is doubt, it is safer to separate and isolate. Later the hypertrophy and consequent shrinkage of the conjunctiva will surely appear if it is a true case. In discussing the treatment he says that the general use of sulphate of copper is not altogether harmless, as it may lead to serious cicatricial contractions. The use of 1 per cent. solution of bichloride of mercury is harmless and is equally good in its curative results as sulphate of copper. Copper citrate is apparently harmless and is devoid of the objectionable features of copper sulphate. General anesthesia is unnecessary in the operation of expression. Cocaine hydrochlorate applied in solid form, about two grains to each eye, answers every requirement and obviates the necessity of a hurried operation, with its frequent extensive laceration of lid tissue.

Cerebro-Spinal Meningitis.—Vanderslice ('Arch. of Pediat.,' 1905, Vol. XVII, p. 537). The author, under the title of "Leptomeningitis," considers the different varieties due to the diplococcus intra-cellularis, pneumococcus tubercle bacillus, streptococcus, and, less often, the gonococcus, typhoid bacillus, colon bacillus, and staphylococcus. The diplococcus intra-cellularis is not always found in cases of epidemic cerebro-spinal meningitis, idopathic meningitis, and chronic basilar or posterior basal meningitis. In many instances the affection causes no diagnostic symptoms during life and is only found at autopsy. The onset may be insidious, epileptiform, or hysterical in character. In the latter there are giddiness, delirium, or somnolence, hyperesthesia to light and sound, and irregular symptoms. Lumbar puncture is a valuable aid to diagnosis. Cases must be differentiated from typhoid fever, pneumonia, acute otitis media, and hysteria. Hydrocephalus, blindness, deafness, and mental disorder are common sequelæ in cases which recover. The nasal douche should be used as a prophylactic measure in the epidemic disease. For general treatment: Cold to head and back of neck; counter-irritation by iodine, blisters, and Paquelin's cautery; inunctions of iodoform, mercury, and belladonna to the shaved head; absolute rest in a cool, darkened room; avoidance of irritation; bathing to control fever; careful feeding; calomel, castor oil, and salines alternately; mercury, iodides and bromides internally; alcohol, digitalis and caffeine if stimulants are necessary. Cerebral pressure should be relieved by draining the ventricles into the subdural space, through the anterior fontanelle, or by lumbar puncture. It should be done early, and has proved partially successful. Francis Huber (loc. cit., p. 579) reports a 25 per cent. recovery in 112 hospital cases during 1904 and a mortality of 66 per cent. He concludes that "the mildest cases require no treatment; the malignant react to none. Medicine, with all its resources, is neither capable of combating the attack nor responsible for its results." (J. C. Wilson.) Faulty notions as to the influence of remedies arise from the difference in the virulence of epidemics. Progress cannot be foreseen from the nature of the onset. Severe cases may unexpectedly clear up, and convalescence is often interrupted by recrudescence or relapse. The treatment is symptomatic and much the same as that recommended by Vanderslice. Huber prefers phenacetin to bromide for the relief of headache as more efficacious and less likely to cause gastric derangement. Severe vomiting is relieved by cracked ice, careful dieting, ice to the epigastric region, hypodermics of morphine, and lumbar puncture. Packs or baths at 90° F. to 98° F. relieve irritability, promote sleep, and lessen muscular spasm. Hot baths at 104° F., with ice bag to head, for fifteen to twenty minutes once or twice a day, as recommended by Aufrecht in 1894, give good results. Lumbar puncture relieves cerebral pressure. Not more than 30 c.c. should be removed unless the pressure is pronounced. The injection of various antiseptics is of doubtful value. A. J. Wolff, of Hartford, found a decided antagonism between the Klebs-Loeffler bacillus and the meningococcus, and that cultures of the latter were killed by antidiphtheritic serum. The serum has not, however, proved of benefit.

Infective Endocarditis.—Judson ('Arch. of Pediat.,' 1905, p. 688). Judson records a case ending in recovery after an illness of over three months. The patient, a boy aged 10 years, was seized with headache, pain in the knees, nausea, and vomiting, followed by chilliness, fever, and a maculo-papular rash. The arthritis spread, and a soft systolic murmur was heard over the precordia at the end of two weeks, with a trace of albuminuria and no splenic enlargement. Salicylates were of no use. The fever ran a typically hectic course, up to 105° F. or more; the spleen became enlarged, and a pure culture of a diplococcus was obtained from the blood. Leucocytosis ranged from 20,000 to 34,800, and anemia was very marked. Edema developed, and for some weeks the boy was extremely ill. On the sixty-fifth day diuresis suddenly set in, and the edema cleared up. This result followed the administration of theocin, in doses of two grains, for five or six days. The fever subsided on the seventy-sixth day. The diagnosis was based on the course of the fever, marked anemia, rash, splenic enlargement, and the diplococcus in the blood. The cardiac muscle was profoundly affected, but the valves escaped with less damage. Embolism, chills, and sweats were absent. Arsenic, iron, and quinine were of little value. Theocin proved a powerful diuretic. Intravenous injections of 3-5 c.c. of 4 per cent. collargol solution on alternate days for twelve days failed and caused increased leucocytosis. When seen six months later the first sound of the heart was indistinct, prolonged, and followed by a faint systolic mitral murmur.

The Association of Adenoids and Beginning Deafness in Young Children.—Phillip D. Kerrison (New York Medical Journal, April 21, 1906). The writer has for some years believed that in a very large proportion of cases chronic catarrhal otitis media has its origin in conditions and diseases incident to child life; and further that chronic deafness is far commoner in young children than is usually supposed. He makes a division of his cases into those in whom impaired hearing has been observed and those with naso-pharyngeal obstruction without affection of the hearing.

In most of the cases with disturbed function the loss of hearing is fairly marked before the patients or the parents have noted the deficiency. These children are nearly all mouth-breathers during some portion of the twenty-four hours. Although some of them breathe through the nose ordinarly, nasal respiration is not carried on during sleep or during the slightest physical activity. Examination of the ears usually reveals marked retraction, and in some cases noticeable congestion of both drum membranes. The author looks upon this bilateral retraction of the drum membranes in a child of ten years or less as pathognomic of naso-pharyngeal obstruction. Although many children suffering from adenoids have characteristic symptoms making the diagnosis easy, there are others that do not present the characteristic picture. This difference is explained in a difference in the distribution of the adenoid tissue. If the hypertrophy is mostly in the median line, nasal obstruction may result, with or without disturbed hearing. On the other hand, comparatively small masses of lymphoid tissue in the lateral fossæ may give rise to tympanic changes which, unless corrected, must inevitably lead to functional disturbance later on. The author emphasizes the importance of the physical appearance of the drums in determining the presence of adenoids.

The author examined a series of cases whose chief subjective symptoms were not referred to the ear. Fifty children were examined, their ages ranging from three to twelve years. The faucial tonsils were enlarged in all but eight cases. Fourteen admitted impaired hearing, but examination showed that the hearing was perfect in but six cases, indeterminable in eleven, and distinctly impaired in thirty-three cases. The striking fact was brought out that the functional disturbance in every instance was slight as compared with that which would be expected with the same degree of retraction in adult patients. A certain amount of neglect of these cases is unavoidable, as in children as well as adults some degree of impairment may exist before any marked disability for the hearing of speech is demonstrated. Whenever it can be determined that aural disease is caused or perpetuated by a naso-pharyngeal growth its removal is the first indication of treatment.

In three weeks to one month after the operation the ears should be examined and the hearing retested. If the drum membranes are still retracted or congested, inflation by the Politzer method, or by catheter, if age and temperament of the patient will permit, often aids in establishing the results for which the operation was undertaken. Patent eustachian tubes, improved hearing, and restoration of the drum membranes to a more nearly normal condition should be regarded as among the tests of a successful result.

Goitre and Rheumatism.—Clemens ('Arch. of Pediat.,' 1905, p. 776). Clemens states that in a series of thirteen cases of parenchymatous goitre under him for acute disease, all had rheumatism. The age of the children varied from eight to twelve years, and twelve of them were girls. The goitres were noticed at six to ten years of age. In all cases there was a strong past history of rheumatism, in the majority a family history, and in three advanced chronic endocarditis. There is a striking similarity in the localities which favor the prevalence of goitre and rheumatism. Quinsy, rheumatism, and epistaxis have been observed as antecedents of exophthalmic goitre.

Prolonged Remissions in Tuberculous Meningitis of Children.—Carriere and Lhote ('La Presse Médicale,' Sept. 2, 1905, p. 560). The authors publish their observations on three cases in the 'Revue de Méd.' (1905, No. 7, p. 469), which prove that if we cannot accept as a reality the definite cure of tubercular meningitis, the existence of prolonged remissions must at least be admitted. In these cases the tubercular meningitis developed at first in the ordinary fashion without any notable peculiarity of etiology or symptoms. Then, instead of presenting all the signs of asphyxia which characterize the last stage, the patients gradually were restored to life; all the symptoms and physical signs lessened; analysis of the cerebro-spinal fluid, of which inoculation had confirmed the tuberculous character, showed a less abundance of lymphocytes and an increase of polynuclear cells. In two cases this period of confirmed meningitis lasted one month, in the other seven weeks. The period of remission had a duration of four and a half months, five months, and nine months respectively. At this period a striking fact was noticed: while the bodily condition improved and various symptoms completely disappeared, the psychic condition remained affected. The disposition underwent a notable change, and sadness was the dominant feature; affection was diminished and unaccustomed irritability shown. Suddenly all the symptoms, without known cause or traumatism, became exaggerated; constipation, headache, modification of pulse, etc., reappeared, and after a short prodromic stage, the entire picture of tubercular meningitis was re-formed. This second meningitis—or rather this last attack of meningitis in evolution for some months—resulted in coma and death after a course of a few days. The autopsy in one case showed lesions in two stages of development, some recent, in the shape of yellow granulations, the others old, in the form of large plaques of thickening and of meningeal sclerosis. Apparently, the primitive lesion tended towards sclerosis—that is to say, towards cure—but the cicatrix formed, or in process of formation, remained as an irritant, sealing up the bacillus for a long period, and acting as a starting point for a new acute inflammatory attack. This latter does not appear to be necessarily fatal, and the possibility may thus be conceived of a definite cure of tubercular meningitis, but we must wait for observations and proofs of it as rigorous as those of the authors.

The Diagnosis of Appendicitis in Children.—J. H. Hess (Arch. of Pediat.). Pain is at first localized to McBurney's point, but soon becomes diffuse. Tenderness is difficult to localize and of little value. Rigidity of rectus present unusually early. Nausea and vomiting usually present a short time after onset of pain. Pulse corresponds with temperature more in children than in adults. Rectal temperatures alone are reliable; the worst cases may run their course without any. Constipation is the rule; tympanites usually a later development. Flexion of thigh well brought out by attempts at extension and flexion of the two thighs. Rectal palpation is of prime importance. Leucocyte count not so valuable as in adults, because of the great range under normal conditions. Iodophilia test of some value. Differential diagnosis: (1) Colic—Absence of localized tenderness and fevers short duration, less intense pain. In older children severe colic is always suspicious. (2) Acute indigestion—Pain less severe but temperature higher, diarrhœa more frequent. (3) Intussusception—Bloody stools and tenderness almost constant; temperature shows little or no elevation at onset; typical tumor palpable through a more or less lax abdominal wall, only moderately hyperesthetic. (4) Acute intestinal obstruction—Onset more abrupt, pain of severer type and remissive; early and persistent vomiting, soon becoming fecal, a condition rare in appendicitis, except in later stages; shock and collapse appear earlier. (5) Psoitis—Traumatic and associated with a deformity due to retraction of thigh. (6) Pott's disease—Absence of intestinal symptoms. (7) Renal colic—Ushered in by chill, pain more posterior: usually absence of temperature, abdominal rigidity and localized pain in right iliac fossa. (8) Biliary colic—Fever absent in uncomplicated cases, and other differential signs. (9) Perityphlitic, or perinephritic abscess—May be secondary to appendicitis and open in loin. (10) Pneumonia and pleurisy—Both may produce abdominal pain in children, associated with constipation, abdominal tenderness, and distension; but there is sudden rise of temperature, acceleration of respiration out of proportion to pulse and temperature, relaxation of abdominal walls between respirations, diminution of tenderness on deep pressure with flat of hand; possible presence of cough. (11) Tuberculous peritonitis must be considered in differentiating the more chronic forms. (12) Incipient inguinial hernia—Examination of all hernial orifices should be made in all cases of suspected appendicitis. (13) Typhoid fever—Widal reaction and low leucocyte count. The most difficult complication to differentiate is a perforating ulcer in an ambulatory typhoid case. (14) Infection of Meckel's diverticulum—Very rare, except early when still attached to the umbilicus, when the infection and distension show themselves in the scar of the cord. (15) Torsion of the cord of an undescended testicle on the right side presents many of the signs of intestinal obstruction.

The Importance of Koplik's Spots in the Diagnosis and Prophylaxis of Measles.—ANDRE BING ('La Presse Médicale,' September. 1905, No. 77, p. 616). The author expresses himself as convinced that Koplik's sign is pathognomonic and early, and thus acquires an importance both from a diagnostic and prophylactic point of view. Stress is laid on a correct description of this sign, which consists of a variable number of eruptive elements, each of which is formed by a rose-colored areola having a small central bluish-white point. The rose-colored spot is exactly like the ordinary measles exanthem; the bluish-white point, slightly raised, adherent to the mucous membrane, is the characteristic element which alone is pathognomonic. It is extremely minute, having a mean diameter of two to six-tenths of a millimeter, and never exceeds one millimeter. Attention is called to the dull appearance of the mucous membrane on the inside of the cheeks when Koplik's spots are present, particularly at the onset and end of their evolution. The rose-colored spots, by coalescence and fusion into the general hyperemia of the mucous membrane, always end by losing their individuality, which, however, is always preserved by the bluish-white points, which never coalesce. The exclusive locality of Koplik's spots is the jugo-labial mucous membrane; they run a definite course and then disappear; they never ulcerate, but sometimes leave behind them a small punctiform hemorrhagic effusion. This description serves to distinguish them from aphthæ, thrush, stomatitis erythemato-pultacea of Comby, etc.

BOOK REVIEWS

ADDRESSES AND OTHER PAPERS.—By William Williams Keen, M.D., LL.D., F.R.C.S. (Hon.). W. B. Saunders & Co., Philadelphia and London.

This volume presents little homogeneity except one of spirit. Some of the addresses and papers are historical, some reminiscent, some didactic and some hortatory, but one and all instinct with a high ideal of the medical calling and an optimistic confidence in its future. The style is an eminently readable one, and whether the author leads the reader through the strange and sometimes devious ways of the "Early History of Practical Anatomy," or with admirable sanity and explicitness removes the misconceptions at the basis of anti-vivisection hysterics, or sketches the recent progress in surgery, or discusses medical education or pictures "The Ideal Physician" or tells us of the later generation true tales of the Civil War and the work its surgeons did "in total darkness with two or three dim lanterns, in a drizzling rain and six inches of Virginia mud," the interest never flags. Indeed, it might be said that the layman would gain from the book almost more than the physician, so well calculated is it to convey to him some comprehension of the place in the social body of that profession which is too often accepted as a matter of course and specially noted only when some extraordinary demands are to be made upon it. But one of the chapters deals explicitly with "The Need for Increased Endowments for Medical Education," but the whole volume might serve the purposes of propaganda in that direction, and certainly anyone who can read without feeling some desire to contribute as he can to the cause of medical progress must be a very phlegmatic individual. And with all the lofty ideals, the enthusiastic teachings and the scholarly information, the light of humor is by no means lacking.

VITAL QUESTIONS.—By Henry D. Chapin, M.D. Thomas Y. Crowell & Co., New York.

No one who has come at all intimately in contact with the life and work of physicians can question Dr. Chapin's contention that they have peculiar facilities for securing a basis for sound judgments as to the vital questions of life, representing as they do, on the one hand the active, practical side of life, and on the other its more intellectual and reflective side. They are less apt than the business man to underestimate the importance of abstract laws and principles, and less apt than the theorist to underestimate the power of actual conditions. But the very fact that they have these facilities sometimes makes them less willing to attempt the solution of such questions than are those whose point of view is more limited. All the more reason for congratulation, therefore, when one of them does attempt to throw the light that is given him on some of the subjects which vex the thoughtful of his day, even if he explicitly disclaims the idea of supplying a panacea for them. In his little volume entitled "Vital Questions" Dr. Chapin has taken up briefly but suggestively a series of topics, which, with their subtitles, give some notion of the scope of the book. They are: Inequality; The Question of Opportunity; The Unfit, A Question of Survival; Poverty, The Question of Subsistence; The Child, A Hopeful Question; Health, The Question of Vigor; Education, The Question of Training; Success, The Question of Achievement; Happiness, The Question of Contentment; Religion, The Question of Faith; Death, The Final Question.

In his adoption of the child as the "hopeful question" and his assigning to it a foremost place in all considerations for general betterment is in consonance with the whole trend of the latest development of social effort. He closes this chapter with the words: "The child is the sphynx of the world, the constant riddle and mystery, before whom all plans of philosophy, codes of ethics, and symptoms of theology somehow prove stumbling, inadequate and unworkable. It is the feeble hand of the little child that always beckons onward in the way of progress. The child has done more for the regeneration of the race than all the creeds that ever have been written."

PEDIATRICS

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ORIGINAL ARTICLES

A STUDY IN THE SO-CALLED INFANTILE PARALYSES

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The so-called Infantile Paralyses may be divided into two groups, the spastic, and the non-spastic. The most frequent cause of the non-spastic form is the affection described as Anterior Poliomyelitis.

Acute anterior poliomyelitis has been defined by Olser as "an affection occurring most commonly within the first three years of life, characterized by fever, loss of power in certain muscles, and rapid atrophy." By statistics it has been shown that next to rachitis, poliomyelitis is the most prolific source of deformity, and of deformity which never disappears spontaneously.

Observations made at the Children's Memorial Hospital suggest that it is a disease which, although occurring most frequently within the first three years of life, is not extremely uncommon even up to adult life; that frequently there is a history of an acute febrile onset followed by paralysis and paresis in single muscles, or groups of muscles. These paralyses usually attain their maximum intensity at once, or almost at once. Quite as frequently, however, there can be elicited no history of a premonitory febrile attack, but rather, the history of a slight, perhaps progressive, loss of power in certain muscles, or groups of muscles, which has become noticeable to the friends of a patient who previously was supposed to be in perfect health and condition. In both classes of cases atrophy is soon noticed, and this accompanied quite frequently by deformities of various forms.

Read in Abstract at the Montreal Medico-Chirurgical Society, November, 1906.

Etiology.—The cause of this disease is unknown. It has been attributed to detention, over-exertion, cold, exposure and even traumatism. The occurrence of this disease after infective fevers may demonstrate either a toxic origin or that the infective fevers predispose to this affection.

Painter (1) of Boston, drawing his conclusions from his study made of the epidemic which occurred in Glouscester in the summer of 1900 states, that we have as good evidence of the infectiousness of anterior poliomyelitis as we have in the case of scarlet fever; that it is probable that there may be several organisms capable of producing this "symptom complex."

The pathological alterations found in the few early cases, where an examination has been possible, show that the latest lesions are dependent upon an acute inflammation causing a secondary destruction of nerve-cells. This inflammation was, at one time, considered to be due to a selective action of the poison for the cells of the anterior cornua, but more recently the distribution of the inflammation has been said to depend upon the blood supply. Marie and others have thought the initial process is embolism or thrombosis, the result of an acute infection.

Head and Campbell (6) deny that the disease is directly secondary to occlusion or interference with a vessel, and have strongly expressed the opinion that the thrombosis is secondary to an acute infection, probably of bacterial origin, but Batten (7) draws our attention, in his article on the Pathology of Infantile Paralysis, to the fact that exactly similar changes as are found in Infantile Paralysis, viz., hæmorrhages and small cell exudation, may be produced by obliteration of small vessels, and concludes:—

(1) That the condition is due to a primary thrombosis of a branch or branches of the anterior spinal artery supplying the gray matter of the anterior horn.

(2) That such thrombosis may be produced by many and various forms of infection, and the disease is not due to a special specific infection.

(3) That the condition is more likely to occur in the lumbar region owing to the blood supply of this portion of the cord being at a point more distal from the heart, and the long course of the reinforcing arteries.

Epidemics have been reported by Colmer in 1843, Bengenholtz in 1881 and by Oxholm about the same time; Media in 1887, by Cordier in 1885 and by Caverley (2), Brackett (3), Painter (4) and many others.

It sometimes attacks two or more children in the same house at, or about the same time. W. Pasteur (5) reported in 1897 a family of seven children being attacked by this disease at the same time. The isolated cases are, however, by far the most frequent.

The epidemics reported, and those occasions upon which two or more members of the same family have been affected suggest a specific causation for this disease, but it is possible that epidemics and groups of cases may be attributed simply to atmospheric or other extraneous conditions increasing the liability to this affection in one particular locality or dwelling.

Morbid Anatomy.—Examinations have shown that the disease is due to an acute inflammation in the anterior cornua of the spinal cord. This inflammation causes, or is accompanied by, a large amount of small round-cell exudation, hæmorrhages and thrombosis of vessels. It is followed by necrosis, and finally by cicatrization.

Goldscheider, Siemerling and others have demonstrated that the disease is localized in the parts supplied by the ventral median branch of the ventral spinal artery.

Clinically the complete paralysis which occurs so often at first, and the rapid recovery of the majority of muscular groups, point to a pressure on nerve elements and cells rather than to a destructive inflammation.

The lesions are most frequently seen in the lumbar and cervical enlargement. The meninges may be involved in the inflammation.

Although there may be still some doubt as to the earliest pathological lesions found in the cord, as this affection is so rarely fatal, there is no doubt, however, that the persistent paralyses are the result of necrosis of the large motor cells in the anterior cornua, but it is necessary to note that our knowledge of the lesions seen on examination of the spinal cord after the termination of the acute stage of this affection may be insufficient to enable us to properly differentiate between cells atrophied, primarily through this affection, and those atrophied through disuse. It will, perhaps, be necessary to explain this by stating briefly a fact which will be accentuated in this paper, viz., that the paralyses, or often more correctly speaking the pseudo-paralyses following anterior poliomyelitis, can only be partly attributed to destruction of nerve cells; that loss of function in the muscles supplied by these cells is quite frequently due to stretching or to disuse, and conversely an atrophy of nerve cells may possibly be attributable to the loss of function in muscular fibers governed by these cells and condemned to disuse by the stretched condition of the muscle. This latter statement could, however, be verified, only, by comparisions made with similar spinal ganglia in the cords of those who had lost extremities, or in ankyloses, and, perhaps, in cerebral-palsies.

Symptoms.—With or without slight indisposition or feverishness the patient loses the use of one or more groups of muscles. Convulsions at the onset are rare, not usual, as in the acute infantile hemiplegias. Fever although often, or perhaps always, present may not be noticed. Pain and tenderness in the affected limbs are frequent in those cases with an acute onset, where, also, the paralysis soon reaches its maximum; usually in a few hours. The severity of the pain is said to depend upon the amount of involvement of the meninges. The distribution of the paralysis follows no rule. The lower extremities are most frequently affected; indeed in over eighty per cent. of these cases one or both lower extremities are involved. The paralysis is, however, not necessarily confined to the limbs, but may affect the body, more especially the muscles of the back. The muscles of the lower extremity are usually stated to be involved in the following order of frequency,—

(1) The Peronei, (2) The Extensors of the Toes, (3) The Quadriceps, (4) The Tibiales.

The hamstrings and the muscles of the calf are about equally attacked. The muscles which most frequently escape are the sartorius and illio psoas. In the experience of the Children's Memorial Hospital the tibiales are more frequently affected than either the extensors of the toes or the quadriceps.

The muscles most frequently attacked in the arm are, in the order of frequency, the deltoid, the shoulder group, consisting of the deltoid and supra and infra spinatus, the biceps and supinators (these being generally conjointly affected). The flexors of the hand are more rarely affected. The sphincters are rarely involved, and there is no tendency to decubitus. In the early stages the reflexes and electrical excitability are said to be increased, but later both are diminished.

The paralysis is usually at its height in from a few hours to a week or ten days.

This early stage is followed about the end of the first week by a period of degeneration when not only the cells of the anterior cornua degenerate, as is shown by the gradual loss of reflexes, but the excentric nerves and muscles depending on the spinal ganglia whose function is irreparably gone begin to degenerate either through lack of spinal nutrition, disease or stretching.

Accompanying these degenerative changes a period of regeneration gradually begins. The paralysis, which usually for a period varying from six weeks to three months has remained stationary, begins to improve, and at first rapidly, until gradually improvement ceases. After six months it is rare to see any improvement in untreated cases, but before this time has passed the functions of many muscles, or muscular fibres, which have weathered the storm returns, and consequently, we have degeneration accompanied by regeneration. The degeneration of the excentric nerves and the muscles, disuse, and stretching from unapposed muscular action together with the central lesion result in atrophy of the parts which become flaccid and the affected muscles soft and flabby. From this condition complete recovery is rare.

Sensation is unaffected after the earliest stage of this disease. The skin reflexes are absent and the deep reflexes in the affected muscles are usually lost. There is no response to either direct or indirect Faradization if the loss of power is complete. Duchenne has shown that faradic excitability completely vanishes by the seventh day or at the latest in the second week.

When the paralysis persists, the wasting is often extreme. The growth of the bone is frequently affected and the ligaments of the joints may be so relaxed that subluxations are apt to occur.

When the upper portion of the cord is affected, cerebral symptoms may make their appearance in the adult. (8)

Diagnosis.—Although the diagnosis is often made without difficulty occasionally there are seen patients in whom great difficulty is experienced in making a diagnosis.

The paralyses of anterior poliomyelitis must be distinguished from the cerebral paralyses. This although sometimes difficult, is done by the history, the character of the paralysis, the age, the condition of the muscles, the rapid wasting, the absence of reflexes, the loss or partial loss of farado-muscular excitability. In other words, by the differences between a flaccid, and a spastic, paralysis.

Progressive muscular atrophy, rarely found in childhood, sometimes begins in the legs. This betrays no loss of reflexes while any muscular tissue remains.

Pseudo-hypertrophic paralysis is differentiated by its history and the excess of muscular tissue in the early stage.

Multiple Neuritis, which is extremely rare in children, is distinguished by its symmetry, by affecting the peripheral muscles and especially by the acute sensory disturbance.

The pseudo-paresis of Rickets is a condition which is quite common amongst the children of foreigners in this country. In this there is little or no atrophy and the child always presents such characteristic symptoms of rickets that little difficulty should be experienced.

Disease of the joints and "limp-chorea" may also be confused with it. The paralysis and deformities resulting from a bifid spine may at first cause confusion. The characteristic deformities accompanying Friedreich's Ataxia are not unlikely to be confounded with the lesions due to poliomyelitis, but the history and accompanying characteristic lesions should always be sufficient to exclude these.

Paralysis from obstetrical operations is noticed immediately after birth while anterior poliomyelitis occurs rarely before the twelfth month.

Prognosis.—The prognosis for perfect recovery is always bad. The physician who sees the patient during the first two weeks, while feeling reasonably sure that improvement will occur, should impress upon the friends that the outlook for complete recovery is bad. The surgeon however, who sees the patient at a later period, when contractures and deformities have occured, can give a more cheerful prognosis. Experience has shown that in all cases by education and conservative surgery, improvement, and in many cases marked improvement can be aimed at.

Treatment.—Treatment can be separated into (1) that for the primary stage, or the period of central degeneration; (2) the secondary stage, or the time when regeneration accompanies degeneration, and, (3) the tertiary stage, or the treatment of the deformities resulting.

Primary Stage.—The treatment of the acute stage usually falls to the physician. It is hardly necessary for me to argue either for or against treatment during the acute inflammatory stage. Protection of the parts controlled by the affected nerve cells should be assidiously carried out, and measures to stimulate absorption at the seat of the primary lesion would seem to be rational when there is evidence to show that the paralysis *may be primarily due to pressure* followed by atrophy of the large cells in the anterior cornua, further, in studying the pathology of this disease compared with the pathological findings in the cords of two patients, who suffered from herpes zoster, examined by Head and Campbell, we find that the lesions exactly correspond. Now it has been proven that in herpes, although certain of the ganglia cells are killed outright, others, however they may have been changed at the onset, rapidly recover, and clinically it would seem that in anterior Poliomyelitis cells which at first appeared to be paralyzed later resume their function.

The Primary Stage gradually subsides, and we have the secondary stage, viz., that of "degeneration and regeneration," which, at present, is certainly the most important time for treatment aiming at the prevention of deformity.

Secondary Stage.—The key-note to both the preventive treatment, and later the mechanical and operative treatment, is the recognition of two important facts:— first, if the limb is not completely paralyzed contraction of the non-paralyzed muscles act very harmfully on their opponents; secondly, cell destruction is not so extensive as would at first appear, and the affection as far as the majority of cells are concerned is a transient and a recoverable one.

Muscles lose their power, are affected with a pseudo-paralysis from stretching and disuse. This pseudo-paralysis must not be mistaken for that resulting from a cell destruction. As an example:— a whole arm may be paralyzed. The flexors may recover first and through their contraction, possibly aided by gravity, such flexion may be produced that the extensors will become overstretched and lengthened, whilst the flexors will become shortened and contracted. In order to profit by this knowledge let us consider what are the common deformities which follow this affection, and which should be prevented. In a completely paralyzed arm the deformity to prevent is one of flexion of the wrist and elbow, and partial flexion of the fingers; at the ankle it is extension and inversion or eversion; at the knee flexion, at the hip flexion, often with external rotation. These deformities are due to gravity, the shape of articular facets, and to unbalanced muscular action.

Immediately after the first stage of the affection under consideration most careful treatment should be preserved in to prevent deformities, and to conserve every force that remains. Massage, manipulation, and possibly electricity are the chief agents at our command during the period of "degeneration and regeneration." The first two agents are certainly of great value and the use of electricity is considered to be so by many. It is in this stage that temporary braces or supports are often necessary, although it is well to remember that we cannot hope for compensatory muscular development if we indiscriminately cage up all partially paralyzed limbs. If any branch of treatment has been neglected in the past it is this, the preventive treatment, the treatment which should be persevered in during the period of "degeneration and regeneration" that deformities may be prevented, that muscular power may be conserved.

The time for surgical intervention is as soon as possible after the attack. If this were generally recognized anterior poliomyelitis would not be followed by fixed deformities requiring tenotomy, and only those surgical procedures which aim at the restoration of power and stability would be required.

Whilst the fever lasts such medical treatment as offers a prospect of reducing its severity should be used, but when it is over the patient should remain under surgical care. The first endeavor of the surgeon should be to minimize the damage threatened to the parts governed by the nerve cells affected. In the earliest stages this is best accomplished by massage and warmth. Until one has had an opportunity of judging which group of muscles are affected, it is well to employ general massage of the parts affected. For similar purposes thick flannel or absorbent cotton should surround the extremity, but care should be taken that an already impeded circulation will not be affected. As soon as one is able to discover the amount of positive damage, massage should be mainly directed to the affected muscles, but even before this has been ascertained the limb is kept in a position opposed to the usual deformities which experience has proven are perhaps most subject to the laws of gravity. In the lower extremity the flexors are less frequently affected than the extensors, and hence the contraction will occur at the flexor aspect of the joints. This contraction not only causes the limb to assume an abnormal position, but it also overstretches the already weakened extensor muscles, and so helps to prevent their recovery. To illustrate this statement let us take for example the treatment for this stage of an extensively paralyzed lower extremity. In such a case we would keep each joint in the position of equilibrium, say mid-way, between flexion and extension, at the same time carefully massaging to improve the circulation of the affected parts. That this treatment may best be carried out the patient should be placed in the recumbent position, and a long straight splint with a footpiece should be fitted to the lower extremity. This should reach from the hip down to the foot and should be used with light extension. Perhaps the best splint for this purpose would be the modification of the Thomas Knee Splint. Two or three times a day this splint may be removed and thorough massage and manipulation performed, and later active and passive movements encouraged. This treatment must be continued until it is evident that no further recovery can be expected in the affected nerve-cells, when the patient should be provided with a suitable retentive apparatus and encouraged to walk. After six months it is rare for any untreated case to improve (Jones). It is now that the patient must be educated to compensate for his loss.

Tertiary Stage:—The measures at our disposal for the treatment of the deformities resulting from anterior poliomyelitis include not only education, *i. e.,* the endeavor to educate nerve-cells not wholly degenerated to re-assume their governing function and muscle fibres their contractile powers, but operative and mechanical procedures; the former including tenotomy, tendon-grafting, arthrodesis, astragalectomy and allied procedures.

Education:—It is surprising how much can be done by educating the patient to use the muscles which are not wholly paralyzed, and in the case of deformity to use the muscles affected by a pseudo-paralysis. This is done by active movements combined with passive movements directed to lengthen contracted muscles and fascia and to shorten muscles contracted by malposition. Perhaps here it may be well to again accentuate the fact that it is beyond peradventure that the most serious omission made in the treatment of anterior poliomyelitis and the deformities resulting has been our failure to recognize that loss of power in this affection is caused not only by destruction of motor cells, but by disuse, and the stretching due to gravity and the unopposed action of the unaffected muscles. This is not a new doctrine. It was demonstrated by Mr. H. O. Thomas many years ago. There are disabilities due to mechanical causes, and those due to central pathological changes. By a proper appreciation of this difference we need rarely encounter any paralytic deformity. Mr. Thomas was probably the first to demonstrate this truth. The extensors of the fingers and wrists, for instance, are more frequently affected than are the flexors in an attack of anterior poliomyelitis affecting the upper extremity, and, in consequence, wrist-drop frequently results. In these cases two factors come into play. The first is gravity, which places the hand in a semi-flexed position; the second is inefficiently opposed muscular action, which allows the flexors to contract. No improvement can now be hoped for until the strain is entirely removed from the over-stretched extension muscles; we must endeavor to weaken the strong muscles and to strengthen the weak ones. Improvement can be brought about by such procedures during many years after the original lesion. This has been demonstrated by both Mr. Thomas and Mr. Robert Jones. (10)

*Tenotomy.**—The most frequently employed operative procedure for the relief of deformities resulting from anterior poliomyelitis is tenotomy. It is performed both subcutaneously and by open incision. It is nearly always a most simple operation and can be done with little fear that union will not follow; in fact, two surgeons alone, Mr. Tubby of London and Mr. Robert Jones of Liverpool, report having performed over ten thousand tenotomies with only four failures to get union.

The history and description of the operation of tenotomy are of such interest that your attention is drawn to the words of the late Mr. Noble Smith (11), a surgeon greatly interested in the orthopaedic surgery of his day:—

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*Those interested in this operation might refer to the Biographical Notes, published by A. B. Judson in the Transactions of the American Orthopædic Association, Vol. xii., 1899.

"There is no operation in surgery which is more firmly established, as a sound method of treatment in suitable cases, than that of tenotomy. Before this method was practised the deformities produced by permanent contraction of the muscles, chiefly the result of paralysis, were found by surgeons to be almost irremediable, and they were left, practically untreated. The case of Lord Byron, for instance, is one very generally known. He suffered from a deformity which, during almost any period of his life, could have been relieved by tenotomy, and which certainly could have been cured if he had been operated upon, and thoroughly treated, during childhood.

"The performance of tenotomy as a satisfactory operation dates from the year 1831, when Stromeyer, of Hanover, commenced to divide tendons subcutaneously through a minute opening in the skin. Previous to this date tendons had been divided through an open wound, with frequent bad results from suppuration. In recent years, since the introduction of antiseptic surgery, the open method has been revived, and may be safely employed when absolutely necessary; but for the majority of cases the subcutaneous plan is satisfactory and more simple. The introduction of tenotomy into England, in 1837, was due to the pluck and determination of the late Dr. Little. He himself suffered from talipes equino-varus, and submitted to treatment at the hands of Stromeyer, in opposition to the advice of every English surgeon whom he had previously consulted.

"During the sixty-nine years (now seventy-five),which have passed since the establishment of this operation, many thousands of tendons have been divided in Great Britain alone, and the results which have followed have been so remarkably good, and attended by so few accidents, that it may be said that, with proper precautions and with a due amount of skill upon the part of the surgeon, subcutaneous tenotomy is practically free from risk.

I have just referred to 'accidents' as being 'very few.' With proper care and some experience they ought perhaps never to occur. I may, however, refer to these accidents which have been known to happen.

"1. The entrance of septic matter into the small wound, causing suppuration and possibly blood-poisoning, is an accident which, with antiseptic surgery, ought never to take place.

"2. The wound of an artery,—(when tenotomy is performed in the region of the foot) is not a serious matter, and only needs extra pressure and a prolongation of the after-treatment. Pricking an artery is worse than cutting it right through, as an aneurism may follow the former accident. Pressure for a prolonged period will, however, cure this latter complication.

"3. Injury to a nerve,—The peroneal nerve might be injured in the performance of tenotomy of the biceps femoris. If the biceps tendon is prominent, as usually happens when the muscle is contracted, there need be no fear of injuring the nerve; but if the surgeon has any doubt in the matter he had better approach the tendon by an open wound. The same remarks apply to operations in the region of nerves in the ankle and foot.

"4. Non-union of the cut tendon, weak union, and excessive length of new tendon.—I believe that these accidents, when they occur, are almost invariably due to improper or inefficient treatment after operation.

"Speaking generally, it may be said that the operation of tenotomy is less dangerous than the prick of a pin. The pin will propably be dirty, the surgeon's knife scrupulously and surgically clean.

"However skillfully a tendon may have been divided, the ultimate result will depend upon the care and attention bestowed upon the aftertreatment."

"Fixation after operation.—A plaster of Paris bandage is frequently used to fix a limb after tenotomy; but although this method of fixation is simple and very effective at the time, there are serious objections to its employment. It is obvious that it is not practicable to remove a plaster bandage every few days, and yet it is of the greatest importance to watch thus closely the process of repair in the divided tendons. This repair differs considerably in different patients. In some it takes place very rapidly, in others very slowly. The gap between the cut ends may be filled up in three or four days, and the union be tolerably firm at the end of a week. Upon the other hand, there may be no apparent union at the end of ten days, or even a longer time may elapse before the gap is filled in. In some patients we find the cut ends of the tendons approximating too closely, while in others they recede too far. In the former case we must fix the foot so that the uniting material is more stretched, and in the latter we must approximate the divided ends.

"Several alterations in position may be necessary during the first fortnight or for longer after operation. In a patient upon whom I operated recently for paralytic equinus I could feel no uniting material for a long time, and I therefore gradually extended the foot so as to approximate the cut ends. At the end of the fourth week there was still a complete gap left. I then placed the foot in a position of extreme equinus. A week later a firm union could be felt, whereupon the foot was again brought up to a right angle with the leg. If this child's foot had been fixed in a plaster bandage and left for several weeks there would probably have been a very weak union, or possibly no union at all.

"To retain the foot in the desired postion, small iron splints, which can be bent into any desired position by the surgeon, suffice. They should be softly padded, and fixed by adhesive strappings and bandages."

It may be briefly stated that whereas tenotomies can usually be performed subcutaneously about the ankle, at the hip and knee the incisions should always be open: to this rule there is no exception.

Although it has been the custom on this side of the Atlantic to use plaster of Paris for fixation, a light splint is, as Mr. Noble Smith suggests, certainly safer, because while employing this the progress of the case may be continually watched, and that this is necessary has been demonstrated to most of those who have practised this operation. As an example, suppose the Tendo-Achillis has been divided because of contraction of the muscles of the calf,—union has resulted, but too great a recession of the divided ends having taken place a weak and deformed structure results.

Fasciotomy.—This operation is required much less frequently for the relief of deformities resulting from anterior poliomyelitis than is tenotomy, yet in some of the more or less characteristic deformities, such as talipes equinus, it is sometimes required. This deformity is not infrequently complicated by contraction of the plantar fascia, which may often be relieved by repeated wrenching with the Thomas wrench, but which sometimes requires subcutaneous section.

Tendon Transplantation.—This operation was first performed by Nicoladoni in 1882, Parish and Drobuik in 1892 reported cases. Since then Goldthwait and other American Orthopædic Surgeons have extensively practised it. Tubby and Jones have employed this procedure for relief of many hundreds of cases in England. In Europe Vulpius, Lange, Kunik, Glück, Kümmel and many other surgeons have adopted it.

The rationale of the operation of tendon-transplantation, to use the words of Tubby and Jones (12), is first, to utilize any ill-directed voluntary movement; and, secondly, to restore the balance of power, so far as possible, in the affected part. But it is evident that the joint can never be a fully strong one, since the amount of power at the disposal of the surgeon has been diminished by disease. Yet it must be conceded that a well-balanced joint is better than an ill-balanced and weak one.

Many have been the theories advanced as to how a central influence which has always been exerted to perform a certain definite function can be so affected that it will perform a function diametrically opposed to that which it originally performed; as, for instance, the conversion of extensors into flexors. But, putting aside theories, interesting though they be, it may safely be stated that even such radical change may frequently be made with benefit to our patient. Perhaps, in caution, it may be added by simply counter-balancing opposing forces or detracting from unopposed forces which are acting to the detriment of the patient.

Methods.—There are to-day three principal methods of tendon-transplantation.

(1) The transplantation of a strong tendon into a weak one, or vice versa.

The direct transference of a strong tendon into a new and more favorable bony or periosteal insertion.

(3) The transference of a strong tendon into a new and more favorable insertion by the prolongation of the reinforcing tendon by silk cords.

The first method may be performed in numerous ways which are best understood by referring to the following scheme of Vulpius. (13)

1. Both the weak and the reinforcing tendons are completely divided, and the proximal end of the reinforcing tendon is united to the distal end of the weak.

2. The reinforcing tendon is totally divided, and a slip is par-

tially detached from the distal end of the paralytic tendon, the proximal end of the reinforcing tendon being united to it.

3. Both tendons are divided, and the proximal end of the reinforcing tendon is united to the distal end of the paralytic tendon, and the proximal end of the paralytic tendon to the distal end of the reinforcing tendon, thus affecting a double transfer, crosswise.

This method is very useful in cases where a muscle is not entirely paralyzed, and it is not desired, while reinforcing it, to entirely throw out of gear the remaining healthy fibers in the weakened muscle.

4. The paralysed tendon is left undivided. The reinforcing tendon is completely severed, and its proximal end is grafted into the paralytic tendon, the distal end of the reinforcing tendon being left free.

5. The paralytic tendon is divided, and its distal end pulled on tightly and inserted into the reinforcing tendon.

6. A slip is partially detached from the reinforcing tendon; the paralytic tendon is completely divided, and the reinforcing slip is joined to the distal part of the paralytic tendon.

7. A slip is partially detached from the paralytic tendon, and inserted into the reinforcing tendon.

8. Slips are partially detached from both tendons, and the slips are sutured together.

9. A slip is partially detached from the reinforcing tendon, and inserted into the paralytic tendon.

Of these methods numbers 4, 6 and 9 are generally considered to be most useful.

Of the three principal methods that of direct transplantation into periosteum or bone is, in the experience of the Children's Hospital, the most useful. As an example of this the operation devised for the relief of valgus due to paralysis of the Tibialis Anticus may be cited. The Long Extensor of the Great Toe is detached from its insertion and transplanted either into the periostium over the Internal Cuneiform or base of the first Metatarsal, or, perhaps better, through a canal bored through either of these bones.

The third principal method, viz., that of Lange, must be spoken of at some length, as it has been proven to be of great service in certain conditions the most particular of which is that of the transplantation of the flexors of the knee into the patella in cases of paralysis of the Quadriceps muscles.

Goldthwait (14) in 1897, drew attention to the fact that in paralyses of the extensors of the knee the Sartorius not only frequently escapes, but often slipping backwards and losing the fulcrum which a fully developed quadriceps assures, becomes a strong flexor, and arguing that if this could be brought forward to the patella it would resume its normal function as an extensor, he operated in several cases most successfully. From this followed the attempt to convert certain of the ordinary flexors of the knee, viz., the biceps and semi-tendinosus into extensors by bringing them forward to the patella or the tibia, but this was found to be most difficult because of their insufficient length.

This difficulty has been, however, mastered by Fritz Lange (15) who bridged the interval between the cut end of the flexors and the periosteum of the tibia or the patella with strands of silk, and this with success, as fibrous tissue soon forms around these silken strands creating, indeed, a natural extension to the original tendon.

Tendon-grafting, (at least theoretically) as an operative procedure is a distinct advance on all methods till lately employed, but to be of value it should not be resorted to too soon after the attack of anterior poliomyelitis. Whitman (16) says, "In general, a period of two years at least should intervene between the onset of the paralysis and the operation." We should not expect too much from this operation. "Practical cure is only possible in those cases in which the paralysis is restricted to one of the weaker muscles. "Some of the most satisfactory results are those in which the main object of the procedure has been primarily to remove a distorting force, the actual transplantation being of secondary importance." "The original operation of Nicoladoni, of transplanting the two peronei muscles into the tendo-Achilles is a useful procedure in the sense that it may lessen the tendency towards deformity, but one must indeed be credulous to believe that these two feeble muscles, working at a disadvantage, can actually replace the function of the great calf-muscle."

The result of tendon-grafting at the Hospital for the Relief of the Ruptured and Crippled were given, four years ago, by Gibney. (17).

Good Results in	33 per cent.
Fair Results in	53 per cent.
Negative Results in	14 per cent.

In no case has it been observed that the foot or limb is in a worse condition than before the operation.

In a study of the treatment of paralyses from Anterior Poliomyelitis made by John Dane of Boston, and reported in 1904, the writer concluded with these words, "Wihle tendon grafting may, in certain cases, yield a satisfactory result, the selection of cases for this operation should be much more careful than it was three or four years ago, and for the great majority of hospital cases either astragalectomy or arthrodesis offers, by far, the greatest promise for obtaining a strong useful foot several years after operation." Dane had analyzed fifty consecutive cases operated at the Boston Children's Hospital for deformities resulting from Anterior Poliomyelitis, and arrived at this conclusion, which certainly demonstrates that the claims made by the friends of tendon-grafting were premature, and that the benefits of tendon transplantation have in some cases been shown by experience to be but transitory. This, however, has been suggested quite frequently. At the Montreal Medico-Chirurgical Society in 1903 a patient was shown who was a striking demonstration of the fact that, although, a tendon-grafting done, as in the case then before you, may be surgically a success from a practical standpoint, it may not be successful (18). At the same time it has been repeatedly proven that in selected cases tendon-grafting is one of our most valuable operative procedures for the relief of paralytic deformities in children. Experience at the Children's Memorial Hospital has demonstrated this fact, but further, although it is often wise to attempt to correct deformities by this means alone, tendon-grafting can often be more advantageously combined with other methods of treatment such as are about to be described.

Arthrodesis.—By arthrodesis is meant the denuding of a joint either completely or in part of its cartilaginous covering.

Arthrodesis was practised by Albert of Vienna in 1878. Twenty-six cases were reported by Mr. Robert Jones of Liverpool in 1894, and since that date the operation has been performed many hundreds, perhaps thousands, of times for the relief of deformities resulting from anterior poliomyelitis.

The aim of this operation is to secure fixation, or partial fixation at the joint.

The indications for the operation are,—

(1) For the correction of a flail-like joint.

(2) For the correction of a fixed deformity.

(3) Where a mobile joint is deformed at the moment of pressure.

(4) As an adjunct to tendon-transplantation.

The theoretical disadvantage is the possibility of retarding the growth of the extremity by interference with the epiphysis.

The only real disadvantage is that the limitation of movement, which necessarily results with the correction of deformity, is, as in the case of the knee-joint, often both a trial and a danger to the patient.

The possibility of retarding growth by this procedure has been proven by Dane (19) to be unlikely. Dane secured a series of X-ray photographs of the ankles of those in whom the operation had been performed.

In all of them spicules of new bones between the recently opposed bony surfaces were clearly seen. This confirmed the clinical examination which showed the two bones to be rigidly united, and, further, proved that the distance between the seat of operation and the epiphyseal junction is so great that the destruction of the epiphysis can only arise "from the grossest carelessness on the part of the operator."

In the opinion of Mr. Robert Jones this operation can be safely carried out at any age up to twenty-five years. This age limit is fixed presumably because after that age pain not infrequently follows. Many surgeons consider that arthrodesis should but rarely be performed in early life. Fifteen or sixteen years being what they consider the age of election. The advantages of an early arthrodesis are, however, thus enumerated by Dr. Dane:—

1. "By avoiding the use of costly apparatus for a period of years a considerable saving in money and a still greater saving in trouble is affected for the parents as well as the child.

2. "At an early stage in the trouble the bones are relatively normal, both as regards their shapes and their mutual articulations; nor are there marked malpositions of the foot as a whole, which so often have to be overcome in operations at a later stage.

3. "The tissues are then in a period of great plastic activity, when repair is both quicker and more perfect than in the older child. Cartilage is being changed into bone all through the foot, and we have less fear of a failure to secure bony union at the site of operation.

4. "When at an early age the foot is secured in a relatively normal position the statics of the lower limb are not so much disturbed, and growth goes on under more nearly normal conditions than can be possible when there is a constantly increasing tendency to the transmission of weight along abnormal lines.

5. "By avoiding mechanical support the unaffected and partially paralyzed muscles are not subjected to the injury inseparable from the use of constricting bands and straps. They have, in consequence, a freer blood supply and develop more rapidly. The improvement in muscular power in the two cases which I have to report was, however, in excess of what I can account for from this cause alone. Provisionally I would suggest that it may be due to the rigid fixation of the ankle-joint preventing abnormal movements from overextending the weakened muscles and exciting reflex action, and still more to its giving the child a sense of security which causes it to exercise more freely and naturally."

Arthrodesis is undoubtedly an operative procedure of great value when performed at the ankle. Its value at the knee-joint is questionable, as this joint can be governed so well by apparatus and it seems doubtful whether it is wise to submit the patient to the discomfort of an immoveable knee-joint when it is remembered that this joint can be controlled by a double unright brace with a catch-joint under the patient's control; and, again, it is necessary to realize the increased liability to fracture in an extremity presenting so great a leverage. Further, it has been proven that in certain deformities about the ankle and especially that of calcaneous, the allied operation of astragalectomy will often be more satisfactory than will arthrodesis.

Astragalectomy.—Of all deformities of the foot that which has proved the most difficult to control is calcaneus. Its cause is the loss of the calf muscles. When those muscles which are attached to the posterior surface of the Os Calcis are paralyzed, the extensors being insufficiently opposed, dorsal flexion results and the posterior surface of the os calcis assumes the position of the inferior surface. To this condition a secondary deformity is added. The longitudinal arch becomes exaggerated through the action and retraction of the remaining unparalyzed muscles and the tissues.

Innumerable varieties of braces or supports have been suggested for the temporary rectification of this deformity, yet the general results of mechanical treatment have been unsatisfactory. Willett's operation of shortening the tendo-Achilles can hardly be expected to suffice.

Although tendon-transplantation was first perfomed by Nicoladoni for the relief of this deformity, the two peronei being drawn back and used to reinforce the tendo-Archilles, this condition, of all others, as Whitman (20) has pointed out, is where tendon-grafting is of least value, for how can the peronei be hoped to replace the calf-muscle which is stronger by ten times than the two muscles used to replace it?

Arthrodesis, in many cases, is quite sufficient to relieve this condition of calcaneus, but when we have a compound deformity, where lateral deformity is present, arthrodesis may not suffice, in which case astragalectomy will probably result in a useful foot for the patient. In performing this operation, however, it is best to follow Whitman who, perhaps best, described its usefulness for patients presenting the Calcaneus deformity, and to combine with it both tendon-grafting and arthrodesis.

Nerve Transplantation or Anastamosis.—This is an operative procedure which theoretically suggests many possibilities, but which practically has not yet been shown to be justifiable, except in a certain few conditions.

One of the first experiments made in the transplantation of a nerve was that of Faure in 1898. This was followed by that of Barrago-Ciarella in 1901, as well as by Manasse in1900. Harvey Cushing reported a case of nerve anastamosis in 1903, and since then many orthopædic and other surgeons have reported operations with varied success.

Although such operations as the transplantation of the spinal accessory nerve into the facial in cases of paralysis of the latter nerve are certainly justifiable, as so little is sacrificed by these procedures, it is difficult to see what can, under ordinary circumstances, justify the transference of either a nerve whose function is of any importance into one whose function is lost, or the anastamosis of a nerve whose function is lost with a nerve of any importance, because of the danger of injury to the latter. Again, in orthopædic practice, how rare it is to find a condition where the opportunity of relieving deformity by nerve anastamosis can be considered, although there is no possibility of improving our patient's condition by tendon-grafting and the allied procedures already described as rarely followed by painful results.

From a neurological point of view nerve anastamosis and the possibility of the transference of nerve impulses, through a new and artificial course, is of great interest, but as a practical surgical procedure the field of its usefulness seems to be most limited.

Conclusion.—In discussing the treatment of the deformities resulting from anterior poliomyelitis very little has been said about the use of mechanical apparatus. This omission is in keeping with the purpose of the paper, because rarely has experience demonstrated that the application of a brace is followed by improvement. It is true that progressive deformity it often prevented by the application of a brace; but yet how often, coincidentally, has a clumsy and imprisoning apparatus prevented the freedom necessary to the natural development of unparalyzed and but slightly paralyzed muscles! It is certain that we must continue to use mechanical supports in many conditions, but we should rarely advise such means of control unless all other methods have failed; or, again, unless we are dealing with inoperable conditions; or as a useful adjunct to more scientific surgical procedures.

EXAMPLES OF TREATMENT.

Paralysis about the Ankle Joint.—The most common deformities resulting from paralyses at the ankle are:—

Talipes Equinus, due to paralysis of the Extensors.

Talipses Calcaneus, due to paralysis of the Calf Muscle.

Talipes Varus, due to paralysis of the Peronei.

Talipes Valgus, due to paralysis of the Tibiales.

There may be compound deformities. Either of the first two may coexist with either of the second two, *i. e.*, an anterior-posterior deformity may coexist with a lateral deformity.

In the treatment of any of these deformities the first consideration must always be whether the condition is a fixed-deformity, *i. e.*, where the deformity is the result of persistent malposition acting on the bony structures and deforming them, or whether the deformity is the result of a stretching, a contraction, or a stretching and a contraction, of any group of muscles or opposing groups of muscles.

In the first class of cases it is very doubtful whether any operation or means of treatment which falls short of an osteotomy or arthrodesis will suffice; but in the second group it is quite frequently unnecessary to do more than tenotomize or transplant, or, perhaps, combine the two procedures. As an example, quoting from the words of Messrs. Tubby and Jones.—It is quite evident that a case of simple talipes, or of the compound form may be efficiently treated in either of two ways, less scientifically, by dividing and lengthening the tendons of the sound muscles and maintaining the foot in the corrected position by apparatus for an indefinite period; or, more scientifically, by distributing around the joint some portion of the power possessed by the sound muscles rnnning to waste. And in the latter method lies the principle of tendon-grafting. If however we are not dealing with a case of simple talipes, but one where the bones have been displacd and deformed, it is most probable that nothing but the removal of parts of the deformed bone, or even the whole bone, will be satisfactory.

Talipes, Equinus, Equino-Varus and Equino-Valgus.—This deformity is usually complicated by flexion at the toes with yielding at the mediotarsal joint and a compensatory shortening of the plantar fascia. It is due to a paralysis of the extensors with a compensatory contraction of the muscles of the calf.

Our first procedure should be to stretch, or divide, the plantar fascia. The condition of varus or valgus should then be rectified. It is then necessary to tenotomize the Tendo Achilles, which procedure should be followed by a carefully selected posture assuring the adoptive shortening of the extensors in cases where it is certain that these only are affected with a pseudo-paralysis due to stretching. This position can best be maintained by either plaster of Paris or a suitable iron-brace, which latter method is to be preferred as the brace is easily removable and allows of massage and other methods for the revivifying of muscular fibers. In obstinate cases osteotomies and arthrodesis must be considered.

Talipes Cancaneus.—This deformity is due to paralysis of the muscles of the calf. On account of this fact that neither tenotomy, nor mechanical treatment ever could be expected to give satisfactory results, Whitman (21) proposed the removal of the astragalus. This operation he has performed with success, and it has been in the past the practise in the Children's Hospital to follow him in this, as in many other methods of treatment. There are, however, certain dependent deformities, such as the contraction of the plantar fascia, which must previously be dealt with, and others such as valgus and varus which are dealt with concurrently. Tendon-transplantation may be tried in this form of deformity either in conjunction with the more radical operation suggested above, or it may be tried previously, although as Whitman has pointed out, this procedure is of less value in this condition than in all others because the muscles of the calf are nearly double the strength of all the other muscles of the foot combined. If this procedure is decided upon the Peroneus Longus and the Flexor Longus Hallucis are usually grafted into the Tendo Achilles, but it has been noted by Tubby and Jones, surgeons who are more favorable to less radical procedures in the treatment of this condition than is Whitman, that at least the removal of a wedge-shaped piece of the astragalus is often advantageous, indeed necessary, if calcaneus be accompanied by either varus or valgus. These English surgeons recommend that an arthrodesis be performed when the paralysis is severe, but this may be disappointing if lateral deformity be present.

Hoffa (22) recommends an oblique osteotomy of the calcaneus so as to bring the tuber calcanei upwards and thus obtain "a real shortening of the tendon;" but it is difficult to see that Hoffa's procedure is any better than that of Walsham or even Willett, which consisted essentially of shortening the Tendo Achilles which experience has shown to be frequently of little more than temporary value.

In the Children's Hospital arthrodesis, with tendon-transplantation, is preferred, but experience has demonstrated that not infrequently it has been found necessary to remove the astragalus to obtain a satisfactory result.

Talipes, Varus and Valgus.—In severe cases these are treated by either tendon-transplantation or by arthrodesis. In the treatment of valgus the experience of the Children's Hospital has shown that the transference of the Extensor Longus Pollicis into the Internal Cuneiform, or base of the first Metatarsal, via a tunnel drilled through such bone, is of great value. Others may bring the Peroneus Longus across the dorsal aspect of the foot and fix it into the Tibialis Anticus or such similar operation. Apparatus is often quite sufficient in the milder forms of this deformity.

Complete Paralysis of the Muscle about the Ankle Joint would suggest an arthrodesis. This operation often proves to be most helpful in the treatment of patients afflicted with this deformity.

Paralysis of the Muscles Controlling the Knee Joint.—In this condition the surgeon must first assure himself that no contraction of the flexors is present, because if these be contracted they must either be lengthened by extension or tenotmized by the open method. If no contraction remains to be dealt with the surgeon must ascertain what muscles retain sufficient strength to be made use of. As has been mentioned previously, Goldthwait has drawn attention to the fact that in paralyses of the Extensors the Sartorius often escapes, and further, sometimes acts deleteriously as a flexor. Consequently, the transference of this tendon may change what was a power for harm into a power for good. If the Sartorius be paralyzed, but the flexors remain, an attempt may be made to convert these flexors into extensors. This may be done by the method usually ascribed to Fritz Lange. For a short time, at least, after either of these operations, or in the case of inoperable conditions, the caliper knee splint of H. O. Thomas is suggested, although many other controlling agents may be of equal benefit.

Before leaving the subject of the paralysis of the muscles about the knee joint it may be well to state that what is called genu recurvatum sometimes accompanies these conditions. This, however, is usually relieved by the operation suggested to relieve the deformities resulting from the paralyses.

Paralyses about the Hip.—In the study of paralyses of the muscles in relation to the hip-joint the frequent escape of the Psoas and Illiacus will be noticed. This is fortunate, because if even these muscles alone retain their function it seems possible to assure some means of voluntary locomotion in the majority of cases.

In paralyses of muscles about the hip-joint contractures must first be dealt with. After this a suitable splint, such as what is known as a double upright with a pelvic band, or the caliper splint of Mr. Thomas should be secured. The patient should then be educated to walk with one of these and the aid of crutches if necessary.

A paralytic dislocation of the head of the femur may accompany an extensive paralysis of the muscles about the hip-joint. It is often best not to attempt a reduction in such condition.

Paralyses of the Muscles of the Upper Extremity.—Many of the deformities resulting from these conditions can be improved by Mr. Thomas' method of muscle-shortening, as has been already described. For others, tendon-transplantation is indicated, and has been employed with success. The Triceps has been transplanted into the Biceps, and the Pectoralis Major into the Deltoid by both Mr. Tubby and Mr. Jones. Hoffa (23) has transplanted the Trapezius "to the position of a paralyzed Deltoid." Mr. Robt. Jones describes a method for the fixation of a flail-like elbow by the removal of a diamond-shaped piece of skin from the front of this joint. In some cases most power could be placed at the disposal of the patient by excising the head of the humerus.

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VACCINATION, ITS TREATMENT, AND CONDITIONS OF THE INFANT, WHICH PRECLUDE ITS BEING DONE.*

By Major Greenwood, M.D., LL.B.,

In dealing with the prevention of infantile disease, one kind of preventive medicine is of great importance. The science of Bacteriology has made much progress of late years, and the part played by bacteria, in the causation of many infectious diseases, is well recognized. Although, up to the present, the particular organisms have not been isolated, it is almost certain that measles, scarlet fever, and small-pox are due to such influences. Our knowledge of toxins, and anti-toxins is yet in its infancy, but that the theory, on which they are based, rests on a substratum of truth, is now generally believed. Jenner's great discovery of more than a century ago is strongly confirmatory of it, strengthened as it has been by the universal experience of mankind since his time.

In the preservation of infantile life, two points have to be regarded:—

(*a*) Care must be taken with regard to autogenous disease or disease arising from within.

(*b*) Every precaution must also be used to guard against heterogeneous disease, or disease, introduced by extraneous agencies.

With regard to measles, scarlet fever, and other exanthems, with the exception of diphtheria, no reliable protective inoculation has, as yet, been discovered, but the case is happily different with regard to small-pox, a disease, in its uncontrolled state, more virulent and destructive than any of the others In the almost unanimous opinion of the medical profession throughout the world, efficient vaccination, at an early period, affords a nearly absolute immunity against this disease, for at least the first ten or twelve years of life. It is therefore incumbent on the guardian of every child to see that it is vaccinated as soon as possible, and a legal obligation has been imposed by the State, in most civilized countries, to enforce this operation, when the child has attained a certain age. In the United Kingdom, that age is six months, and if, after due notice from the vaccination officer, a certificate of successful vaccination, or of insusceptibility to that operation, is not forthcoming, or unless the operation is postponed on account of the child's health by the medical practitioner in charge, the guardian is liable to prosecution and fine.

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*Practitioner.

The object of this article is to consider, how the normal and healthy course of ordinary vaccinia can be best promoted, to examine the various conditions, that warrant the postponement of vaccination, to trace the various disorders, that may arise from the action of the vaccinal toxin, and to point out a suitable treatment for such complications.

In considering the conditions that contra-indicate vaccination, and render postponement advisable, the presence of small-pox locally in a sporadic or epidemic character, is of the utmost importance. Where postponement might be desirable, and even imperative, in the absence of small-pox from the immediate neighborhood, when it is epidemic, or has broken out in the house where the child resides, vaccination ought nearly always to be unhesitatingly performed. This is governed by the principle that "of two evils choose the less." For the danger, to which an unvaccinated child is exposed in the presence of small-pox, far exceeds that arising from the accidental consequences, or sequelæ, of vaccination.

Where small-pox is not present, and there is no immediate fear of the infection, the following are the best rules that can be laid down:—

(1) Endeavor should always be made to vaccinate, when the child's health is at its best, and any deviation from the normal standard is a reason for considering the advisability of postponement.

(2) Where the child has recently been exposed to the infection of a zymotic disease, such as measles, scarlet fever, or erysipelas; as, for instance, when one of these diseases has lately prevailed in the house, where the child resides, vaccination should be postponed till after the house has been disinfected, or at least till a reasonable time has elapsed from the convalescence of the patient.

(3) Where a child suffers from any form of wasting disease, caution should be exercised, and it is better not to urge the operation unduly on the guardian or parent. That, in such circumstances, the operation necessarily does harm, is by no means

certain, and the experience of many vaccinators would incline to the belief, that it is rare for it to cause any aggravation of the existing evil, while the vaccinal process pursues a normal and healthy course. Generally, however, the practitioner would do well to be cautious. The rapid and serious changes for the worse, that frequently occur in such cases, not to speak of sudden death from ill-defined causes, render it very unwise to risk the possibility of such a catastrophe being ascribed to the vaccination. Though the imputation might be void of truth, it is difficult to disprove, and the discredit, brought on the practitioner and the operation, could not fail to be great.

(4) Care should be taken that the condition of the child's skin is healthy. Any such skin affection, as eczema, impetigo, &c., renders a postponement desirable, as the vaccinal process may not unlikely aggravate the malady, at all events, temporarily. It not infrequently happens that the child's skin is not in a healthy state, although it could not be said to be affected by cutaneous disease. There may be traces of intertrigo behind the ears, a few scabs on the scalp, slight excoriations on the buttocks, an urticarial eruption, or isolated sores, about the body, often due to parasites. Here may also be a slight skin-wound, such as from a burn, where repair is progressing favorably. All these cases should be regarded with caution. The writer has often seen vaccination run a normal course, without in any way increasing the cutaneous lesions. Indeed, sometimes it might appear that a beneficial effect was produced, for chronic sores have rapidly healed after the performance of the operation. But this cannot be relied on, and if any change for the worse occurs, it is sure to be put down to the vaccination. It is, therefore, better to try to cure the sores before operating, bearing in mind the primary rule, that a thoroughly healthy skin is before everything necessary to guarantee a normal and healthy course in the vaccinal process.

(5) Children are liable to many minor ailments during infancy, and it is desirable to consider briefly some of them. It is convenient for our present purpose to divide them into three classes:—

(*a*) Bronchial; (*b*) Gastro-Enteric; (*c*) Neurotic.

(*a*) A slight catarrh does not necessitate a postponement of vaccination. If the child appears otherwise in good health, with no impairment of respiration, and the only ailment stated is a slight cough, the operation may be fearlessly performed. But it is better to ask a few questions about the cough. If the child is said to "croup," or if, from cross-examination of the mother, there is reason to suspect whooping-cough, or laryngismus, the operation should be postponed. Where there is evident coryza, delay is also advisable, if the child has not had measles. Where the respiratory embarrassment is prominent, the necessity of postponement is obvious.

(*b*) Great caution is always necessary where the child is suffering from diarrhœa. Even if there is a suspicion of it, it is better to wait till the looseness of the bowels has subsided. Whether the vaccinia directly aggravates this disorder is doubtful, but some experienced vaccinators are of that opinion. Care is specially necessary in hot weather, and at times when diarrhœa is prevalent among the infantile population. The rapidity, with which diarrhœa, at such times, may run a fatal course in young children, is well known to all practitioners.

(*c*) It is well to postpone vaccination, if any symptoms are present, suggestive of an impending eclampsia. For a child to be seized with a convulsion, shortly after vaccination, would be most unfortunate. Whether the attack was, or was not, aggravated by the operation, could not be accurately determined, but, that it was largely in consequence of it, would most certainly be the opinion of the public. It is not easy to differentiate the eclampsic state, and much must be left to the individual experience of the practitioner. The general aspect of the child is a good indication, and evidence of local spasm is important. Postponement may also be advisable, when signs of dental irritation are pronounced.

With regard to postponement in general, it must not be forgotten that it is an evil. No one can tell when an epidemic of small-pox is impending, or can be sure that it will not break out sporadically in the house, or neighborhood, of some of the postponed cases.

It may then be too late to vaccinate, and the unprotected children will not unlikely become victims. Anything that can be done, to avoid the necessity of postponement, is therefore important.

One method is to offer vaccination as soon after the first month as possible. I have no hesitation in saying that the experience of most public vaccinators prove that no harm results from early vaccination, and that the earlier it is done, the less likelihood is there of physical conditions in the child prohibitive of the operation.

It should be borne in mind that, under the Vaccination Acts, public vaccinators may not call at the homes of children, till after they have attained the age of four months, unless invited by the child's guardian; so that there is plenty of time for the private practitioner to go, in the meanwhile, and point out to his patients the advantage of early vaccination. If this were habitually done, more children, I feel sure, would be vaccinated, and the need for postponement would not so frequently arise. It would further render it unnecessary for the public vaccinator to call so often on the patients of other practitioners, and would tend to remove a grievance, which is frequently a sore point to the latter.

Next, with regard to ailments of children, more or less, directly induced by vaccination, and their treatment.

In considering this subject, the adage that "Prevention is better than cure" must not be lost sight of. There can be no doubt that, if it is desired that vaccination shall go through a perfectly natural and healthy course, three things are necessary:—

(1) The operation must be carefully performed with all aseptic precautions.

(2) Those in charge of the child must have adequate instruction as to its subsequent treatment.

(3) The doctor's directions must be faithfully carried out.

Where all these precautions are observed, it will be rare, indeed, that any harm will ensue, and in most cases, where the vaccination takes an abnormal course, the operator can trace it to neglect of one of these rules.

(1) When performing the operation, it is essential that the surface of the skin, where the lymph is to be inserted should be first systematically cleansed, either with soap and water, or ether. Three or four abrasions should then be made with a lancet, or needles, rendered aseptic by being passing through the flame of a spirit lamp. Care should be taken that the area of all the abrasions, taken together, amounts to about half a square inch. Fresh calf lymph should then be carefully rubbed in. The whole oper-

ation can be quickly done, and in a painless manner: in most cases without making the child cry, a point of some value, when the feelings of the mother, who is usually present, are considered. Aseptic dressings should be applied, and fixed by a pad, or bandage, and the mother should be instructed to keep the dressings in their place, so as to protect the vesicles from accidental injury. The operator should call to inspect abou tthe eighth day following. He should remove the dressings, and if the vesicles are well formed, with a normal areola, little will remain to be done beyond re-dressing the arm, and instructing the mother to send the child for further inspection, if the places do not heal within the next fortnight. If the areola is excessive, and involves more of the skin than usual, *e. g.*, if all the areolæ coalesce, there is a slight degree of inflammation present. In most cases, it rapidly subsides, but it is a good practice to cover the inflamed area with boracic acid powder, before re-applying the dressings. It is advisable, too, to see the arm again, in a day or two, for fear there should be an extension of the inflammatory process. This condition is usually caused by some irritation of the vesicles by friction, and is the first stage of the superficial cellulitis of the arm, which is met with in certain number of cases. A considerable area of the arm may then be involved, there will be delay in the healing of the vesicles, and a certain amount of suppuration. Some enlargement of the axillary glands will also be present, in all probability, but this not infrequently happens in the course of normal vaccination. The treatment, the writer has found most useful, is to cover the affected skin with boracic acid or boracic wool, and lightly bandage, keeping it quite dry. On no account should poultices be applied to the vesicles, though warm boracic fomentations may sometimes be useful. Mostly, a free application of boracic acid, or a mixture of iodoform and boracic, in equal parts, is all that is necessary.

Passing on from simple cases of this nature, we come to a more serious condition, which may be due to simple irritation, introduction of an external poison, or an idiosyncrasy of the patient. About the ninth or tenth day, the pustules become rapidly larger, attaining a size sometimes two or three times the normal, while the areola increases greatly, and the skin of the arm is affected often as low as the elbow or hand; there is also marked enlargement of the axillary glands. The next stage is for each pustule to develop into a foul-looking ulcer, through the sloughing of the skin involved, and in the worst cases, all the ulcers may coalesce into one large one. With this, there may be constitutional symptoms, not unattended with danger, especially if there is much extension of the cutaneous inflammation. In most cases, under suitable treatment, the inflammation of the skin rapidly subsides, except in the immediate vicinity of the ulcer, and the patient makes a gradual, but slow, convalescence. The best treatment is to cover the ulcer with boracic acid and iodoform, and to apply hot boracic fomentations, while the inflamed skin may be dusted with boracic acid, and covered with boracic wool, or treated with evaporating lead lotion. Internally, the bowels should be regulated by small doses of calomel, and a few drops of Tr. Ferri Per. in glycerine, may be given two or three times daily. If suppuration of the axillary glands follow—a sequela very rare—it must be treated on ordinary surgical principles.

Cases of this degree of severity are very uncommon, and, if the child is of good physique, it will probably struggle through quite safely. But is must not be forgotten that there is considerable doubt as to the efficiency of the vaccination. Unless the vaccination has run a perfectly normal course, the result may be practically nil as a protection against small-pox. An early re-vaccination is always advisable, but the suggestion will probably not be well received by the parents of the child.

Erysipelas.—This is the most dangerous complication of vaccination, and is fortunately very rare. It may occur at any stage, but, in the writer's experience, it usually makes its appearance after the child has passed out of the hands of the vaccinator. Several weeks after the inspection, when all seemed healthy, the child is brought to the vaccinator, who is informed that the arm has never quite healed. On making an examination, he finds that two, or more, of the pustules have been followed by normal cicatrices, the remainder are running sores. He may be told that one of the scabs was rubbed off, or that it did not heal like the others. There is a zone of inflammation round the sore, or sores, which may be more or less extensive, and there may be redness and œdema of the forearm, or some other part of the body. Constitutional symptoms may be trivial or severe. Nearly all these cases occur amid dirty surroundings, and where there is reason to suspect neglect. They mostly recover, but the prognosis should be guarded. Convulsions may supervene, or the skin affection extend to many parts of the body. As often as it subsides in one part, it reappears in another. The strength of the child may gradually wane, and exhaustion lead to a fatal result. The treatment is to dust boracic acid over the erysipelatous skin, carefully covering it with dry boracic wool, or lint, to apply boracic fomentations to the sores, and, in other respects, to treat the child on general principles. These cases are properly accidents of vaccinations. The same result would arise from the toxic inoculation of any sore, and the vaccinator can never be justly blamed, unless by carelessness, or the use of septic instruments, he directly introduces the virus, or where he takes no pains to cover up the arm, and so allows it to be exposed to infection, which he might, and ought to have taken precautions against.

There is one other serious complication, and that is what has been called "Multiple Vaccinia." It is very rare, and the writer has only come across one case. It consists of a general eruption of vesicles in parts of body, where no inoculation of lymph has taken place. These may recur for weeks and months, and some may ulcerate and form unhealthy sores. In the case referred to, the child became marasmic and died, and the certificate of the cause of death was "Multiple Vaccinia." A mild variety sometimes occurs, where half a dozen supernumerary vesicles spring up in the vicinity of the inoculated ones, and run through a similar course. These complications can only be treated on general principles.

A few other cutaneous affections may be noticed, which not infrequently follow vaccination. They are too trivial to require treatment, as they invariably disappear after a few days, and are probably due to an idiosyncrasy of the child. This is proved by their appearance in only one child, when, perhaps, half a dozen have been vaccinated from the same source. These eruptions usually appear on the ninth or tenth day after vaccination. They may be papular, vesicular, or erythematous, and are chiefly seen on the extremities. The papular, which may be a simple lichen, like red gum, but somewhat paler in color, or of a more compound character, not unlike nettle rash (lichen urticatus), is the most common. But there may be a vesicular variety, often confused with varicella. An erythematous form (roseola) is sometimes seen, looking very like measles, without the catarrhal symptoms.

It may often be noticed, when one of these eruptions is present, that the arm appears to have "taken" a little too much, that is, is a little inflamed. Whether it is a consequence, or cause, of the eruption, or a mere predisposition, is uncertain. All the varieties are very evanescent, and require no treatment beyond the administration of an aperient, if necessary, and careful attention to any abnormal condition of the vaccinated arm.

In conclusion, the responsibility of practitioners under the Vaccination Acts requires some attention. As vaccination is compulsory, parents can get their children vaccinated at the public cost. When the services of the Public Vaccinator are requisitioned, the duty of transmitting a certificate to the vaccination officer devolves on that official. On the other hand, if the services of a private practitioner are sought, there is no obligation on the latter to carry out this duty. But he is bound, under a penalty, to furnish the guardians of the child with the necessary certificate, for it is their duty to send it to the vaccination officer.

What constitutes a sufficient vaccination to satisfy the law has not been properly defined. No. 7 of "Instructions to Public Vaccinators" lays down that "In all cases of primary vaccination the Public Vaccinator must aim at producing four separate vesicles, or groups of vesicles, not less than half an inch from one another. The total area of vesication resulting from the vaccination should *not be less than half a square inch.*"

Private practitioners are not bound by this instruction, but they ought none the less to endeavor to carry it out, because it is based on the largest experience, and the best knowledge we have on the subject. To vaccinate in one place only—as is too often done—serves but to bring the whole practice into contempt. Experience has abundantly shown that no real protection is afforded by such a vaccination, and it is far better to refuse to operate than be guilty of an act that cannot be defended. If a fee is accepted, it is a fraud, for it is being paid for what is recognized to be valueless, and if not, it is assisting in an evasion of the law, which is particularly unbecoming in a member of a profession largely responsible for legislation on this subject.

Something might be said for a practitioner, who openly avows his disbelief in vaccination, and refuses to perform it; but it is difficult to think charitably of one, who is a believer in the practice, and yet willing to vaccinate in a manner utterly at variance with the teaching of all authorities on the subject.

SOME REMARKS ON ARTIFICIAL FEEDING OF CHILDREN.

By E. Thomas, M.D., of Geneva.

Fellow of Therapeutic and Pediatric Societies of Paris.

When a child cannot be suckled by its mother, the problem of artificial feeding is very difficult. That the subject is worth while is proved by the innumerable works it has inspired, but it is impossible yet to say that a perfect result has been obtained. There is a notable difference between human milk and that of a cow; we know the chemical differences, but the works on ferments will perhaps show that from this point of view as well, they differ. There is no need to speak of other animal's milk, which can be used only as in exceptional instances.

For some years, there has been a reaction in favor of maternal suckling, in France especially, and it is easy to prove that even weak and poor mothers could at least try it for the first months at any rate. One must insist on its necessity with a number of young women who, under one pretext or another, will not take the trouble. It is a general law that function creates organ; a good many of them who seemed incapable at first, succeed in the end in suckling their children sufficiently.

Nevertheless there are cases when feeding with cow's milk is necessary. Let us study some of the most recent works on this subject[1] and see the results which have been given the microbian studies, showing the existence of numerous bacilli in milk, brought there by the milking or the conveyance of it showed the need for sterilized milk. Numerous ways of sterilizing it were invented. There is a possibility of doing it, and such milk is very often used; but numerous physicians, and their number is ever growing, saw that such milk did not agree with many children. Digestive disorders, constipation especially, have been observed; moreover, the albuminoid matters, sugar of milk, fat, salts, ferments are modified in such a way, that the food so prepared, is no more adapted to the child. Even with the Soxhlet's apparatus the modifications are the same; some are obliged to own that sterilization which may be necessary, is far from good in many cases. Besides, if some parts of the milk are ill or not at all digested, they will be contaminated by the intestinal bacteria, and will lead to the formation of lactic acid or albuminoid fermentations, which is harmful. This is a point on which Monti lately insisted; Flügge is of the same opinion.

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[1] Monti. Kinderheilkunde in einselnen Darstellungen, No. 24.

In Hippius' researches, we find that the milk's ferments are still retained in a temperature varying from 60 to 65° C, but the spores and bacteria are not destroyed; on the other hand, a cold temperature prevents the development of spores, without destroying them. Monti proposes to warm the milk to 80° C in ten minutes, and then cool it to 6-8° and keep it at the same temperature until time to use it. This method is excellent in principle, but hard to apply; two pieces of apparatus are necessary, the Soxhlet and an ice box. In consequence, a large part of the population will be unable to use it.

Behring had proposed to keep the milk by destroying microbian action by adding a solution of formalin from 1 : 5000 to 1 : 10000. This formula seemed easy to use, but the Tommasi-Crudeli's experiences proved that the formalin was harmful to the digestive organs, when its use was long continued. Thinness, diarrhœa, meteorism, inflammation of the gastro-intestinal mucous membrane, such were the symptoms observed in animals. Thus it is better to give up this method, since it may be dangerous. Hempel has shown that in a well kept dairy it is possible to obtain milk pure enough to place after heating for three weeks in a culture on albuminose. At the end of that time it contains only 1,600 bacteria, whilst sterilized or pasteurized milk contains in the same condition 280,000 to 370,000 bacteria. He has described the operation used in the milking and seems to obtain thus a really irreproachable food.

We must keep facts in view. If at Geneva, we observed twenty years ago, in summer, many sorts of digestive troubles and often infantile cholera, the frequency of these cases has greatly diminished, and this because physicians have taught mothers of the poor class that milk can be dangerous, and must be kept clean. The dairies themselves have made great progress in this particular respect. It would be difficult to give exact figures, but the fact itself is incontestable.

If we recall these results and if we remember on the other hand the importance of action of milk's ferments, we must own that sterilization is not always the best way. The best aim will always be to improve the health and life of cows, to render the processes of milking and carrying milk as good as possible. This problem is perhaps more difficult in great towns; on the other hand, because of the large consumption, they are better enabled to take every precaution. These considerations bring us to this question: Can one give raw milk without danger; must one do it as a rule? A satisfactory answer cannot be given; experiments are difficult to make. With animals the results will be uncertain, mammifera knowing no other but the maternal milk. The principle is theoretically correct, but for the present, since it is not possible to add to milk substances which prevent the action of bacteria, it is better at least to warm the milk, and thus to diminish the danger.

The differences in the chemical constitution in the two sorts (human and cow's milk) are known, but it is necessary to remember that albumin of one sort of animal is toxic for the others. And as the proportion of albumins is greater in cow's than in human milk, a part will be superfluous and even harmful.

Monti shows in the following way, the differences which are to be reconciled:

Diminish the acidity of cow's milk, which is three times stronger than that of woman.

Diminish the proportion of casein and modify its coagulability.

Increase the proportion of lactalbumin.

Add some fat. It is not possible in this case to use fat of cow's milk, in which the fat acids differ, and because cow's milk is, beside, richer in volatile fat acids.

It is necessary to increase the proportion of sugar.

We cannot remedy the lack of mineral substances, especially chalk and phosphoric acid.

The boiling, sterilization and pasteurization prevent the harmful action of bacteria.

We must not forget modifications, which may take place in cow's milk during lactation.

There is actually no method which will fulfill all these requirements, every one is wrong in one point or another. Some authors tried to employ the milk without addition of any other substance (Vollmilch of German authors). It is clear that these trials could only succeed under the condition of giving very moderate quantities, corresponding about to those which the suckling child receives the number of meals, being itself moderate. At the end of the first month, the following measures could be adopted: five meals, each of 50-60 grams, that is to say, 275-300 grams every twenty-four hours. At the end of the third month, five meals of 110-115 grams, for instance, 550-575 grams. At the end of the eighth month five meals of 195-200 grams, 975-1,000 grams. We can see by these figures the difference between this method and the natural process; we must diminish the doses or mix the milk with water as soon as digestive troubles are observed. The proportions must be increased only if, in the absence of pathologic symptoms, the weight does not increase sufficiently. The considerations, given by same authors, render new observations desirable to arrive at more precise results. Actually, the addition of water to the milk is the most used method and gives the best results; it is susceptible of modification. Let us now examine this point.

The doctrine, which was held until lately, allowed proportion of albumin to be taken as the most important compound of the dilution. We were obliged to render its proportions about equal to those of human milk; as to the quantity of liquid by meal, it was calculated on the gastric capacity, varying with the different ages. We know the numerous works on this subject, they are without doubt interesting, even useful. But a muscular organ is subject to such modifications in different individuals, and according to the age and circumstances of each individual, that this physiological basis is necessarily defective. The first rule is to diminish the number of meals and the proportion of each of them, the albumin of cow's milk requiring a digestive power much more considerable than that of human milk. Monti proposes the following proportions: until the end of the first month, the mixture is of two-thirds of water for one-third of milk, in quantities varying from 20-25 grams for the second day to arrive, to 80-100 grams; that is to say, 400-500 grams in twenty-four hours. The proportion of half milk and half water shall last until the end of the third month; that of a third until the end of the fourth month, the total absorbed at that period being 950-1,000 grams. Of course, that general scheme is susceptible of many variations; if one remembers that, by the dilution with water, cow's milk presents a deficit in carbon hydrates, sugar and fat, that one must try to supply.

Following the laws of isodynamy, one has sought to replace the missing fat by sugar, and several authors add a quantity of sugar of milk in water, varying from 5 to 10%. Physiology may very well not agree with clinic in this respect as in others, and we have long known the digestive disorders which are the sequence of an excessive quantity of sugar. For my part, I do not think it possible to give exact measures, and it is a thing of individual experience more than doctrine. I generally find it better to give rather little than much sugar, if the child seems in good health. I have often noticed that children are in better condition, not with much sugar, but with very little.

The old method of adding veal broth has still its followers; and for weakened and rickety children, Monti thinks there is real advantage in it. This author proposes the following system, which gave good results and seems to fill certain lacks and permit of more rational feeding. First he prepares cream by adding lab ferment to milk, after having warmed it to 35° C; then the cream itself is warmed to 68° and kept afterwards in a cool place. It contains then in per cent. 0.03 casein, 0-80-1 of dissolved albumin 1.2 of fat, 4-5 of sugar, 0.70 of salts. For the first four or six weeks, one mixes two parts of cream and one of milk; later, one adds half of one and half of the other; from the third month, two parts of milk and one part of cream. The mixture is placed in sterilized bottles, warmed with the Soxhlet during ten to fifteen minutes until 60 or 70° C, cooled to 8° and employed thus prepared. If we compare the proportions of human milk and of this mixture we find the following figures: figures:

	Human milk	Monti's milk
Casein	1	1.22
Dissolved albumine	1.19	0.80-1.0
Fat	3.90	2.33
Sugar	6.0	4-5.0
Salts	0.34	0.70

There are some more very slight differences; according to the age of the nurse and the proportions of the mixture, the similarity is very great. Cream has the advantage of facilitating the digestion of the casein. As regards the quantities, it is necessary to observe the same rules as with the milk mixed with water.

Methods of Backhaus, Gaertner, Vigier, Biedert, etc., are sufficiently known to render it useless to speak about them; the same is true of the various foods, as Mellin's, Nestle's, etc.

Let us now draw some practical conclusions from this short study. It is indispensable to work more and more for perfect cleanliness of milk, this by a very close surveillance of the stables, of the methods of carrying the milk, of the utensils of all sorts in which it stays. Already some attempts have shown the possibility of obtaining much purer milk than formerly; the administration of large towns must be very strict on this point.

The cows must be watched narrowly, and it is desirable that no milk be delivered to the public, without having been first proved by the tuberculine. The modern school demonstrates that the ingestion of the Koch's bacillus is by far the predominant factor, in the etiology of tuberculosis. These measures are all the more necessary, because the sterilization of milk is not a process without drawbacks since it kills the normal ferments or diminishes considerably their action.

Among the methods of feeding, the mixture with water can be considered, if not as the best, at least as the most practical, especially in poor families.

The most recent studies show that it is necessary to give fewer meals, and in less quantity than before.

When it is possible, the Monti's method (mixture of cream and milk) has great advantages for children in good health. In the case of digestive troubles, whatever be the cause, it is impossible to give rules applying to all; it is important to consider every case in itself, and to adopt the measures which seem the more useful, according to the nature of circumstances.

SOCIETY PROCEEDINGS

MEETING OF THE BETHESDA PEDIATRIC SOCIETY,

October 19, 1906.

Spasmophilia. Dr. John Zahorsky read a paper on this subject. He called attention to this word as a fitting term for all those diseases characterized by increased excitability of the nerves due to some nutritive derangement. It includes tetany, carpopedal spasm, laryngysmus and eclampsia. Finkelstein recently discovered that cow's milk increased the excitability, but Dr. Zahorsky questioned the correctness of these conclusions when pure fresh unboiled milk is used. He reported a case of severe laryngospasm and eclampsia with Chvostek's phenomenon well marked, which had been produced by market milk. On the administration of fresh cow's milk the severe symptoms rapidly disappeared. He referred to other cases in which condensed milk and sterilized milk had been used, but he has not found a single case among infants fed on fresh, unboiled cow's milk. Further observation is necessary to establish whether cow's milk, *per se* increases the nerve excitability or whether the process of heating the milk or some bacterial contamination is etiologically related to spasmophilia. He does not hesitate to place cases of spasmophilia on fresh cow's milk, although no doubt, in severe laryngospasm the discontinuance of all milk for two or three days may be the safest practice.

Dr. Jas. Holland spoke of some ideas recently expressed by Baginsky on the use of milk in these cases.

Dr. Wm. L. Johnson said that he had never seen a case of tetany or rickets that had not been fed on some artificial food. He stated that modified cow's milk does well in these cases unless spoiled by heat, and that good results can be obtained from its use, or, of course, better results from the wet-nurse.

Uremia.—Dr. Wm. L. Johnson reported a case of *Uremia* in a male infant two months old, which similated Meningitis. The bottle-fed infant had a gastrœnteric infection. About the fourth day, there were vomiting, convulsive movements, fixed pupils, apparent blindness, hemiplegic signs, with unilateral injected conjunctiva, and Cheyne Stokes respiration. The only sign against the diagnosis of meningitis was the depressed fontanelle. The bladder being paralyzed, catheterization was resorted to, and the urine showed much albumin and many casts; these symptoms, with subsequent almost complete anuria, passing away in four days, leads to the conclusion that they were due to uremia. The urine gradually cleared up.

Dr. Geo. M. Tuttle, related the history of a case similar to Dr. Johnson's, in which the symptoms of intestinal toxemia obscured for the moment, the diagnosis of meningitis. This diagnosis was made upon the subsidence of the intestinal trouble.

Post mortem examination revealed an intense nephritis which had not been suspected during life.

EDITORIAL

THE RECLAMATION OF TRUANTS: WORK OF THE CHICAGO CONFERENCE.

The immediate occasion of the conference on truancy held in Chicago last December was the decision of the Board of Education to build a school of detention in connection with the city's new juvenile court building. A decision so radically novel in character naturally was not arrived at without much discussion, bringing out the necessity for real cöoperation on the part of the educational influence of the city with the juvenile court work, and the comparative futility of much of this work without such a joining of efforts. It was perceived that a higher degree of efficiency could be attained in the work of salvation of juvenile offenders if the schools would reach out their arms to keep hold of children who are lapsing in their attendance, or have even drifted into small misdemeanors which bring them before the court,—and particularly by having a school for children undergoing temporary detention near the court and in close co-operation with it; and that such a school, manned by wise and inspiring teachers, might be a means of really reclaiming many children.

All this consideration of the matter revealed many spots in the schools where more could be done to keep these children from their first lapses; many spots where failures in the school system left children unheeded to the mercy of the streets with their beguilements to juvenile idleness.

The conference on truancy therefore, was called to make a study of all the possible ways in which court and school together could make their work more effective to prevent the waste of life going on in the school room, through truancy to the juvenile court and beyond. The further the process goes, the more difficult the reclaiming becomes. The keynote of the entire conference was its ideal of reducing the juvenile court to a minimum, of making the schools so efficient that the work of the court might be rendered unnecessary.

Speakers came from all parts of the United States to enrich the Conference with their rich experience and all the phases of the question were illumined with rare contributions. Dr. Luther H.

Gulick, of New York City, aroused enthusiasm with his address on the tremendous force of school athletics as a preventive of truancy. James P. Haney, pleaded for more manual training for boys who care for nothing else. The secretary of the Chicago Child Labor Committee showed the proportion of truants from school whose earnings were a necessary factor in the family support and discussed the scholarship plan for givng such children the amount of their earnings on condition they attend school. A representative of the New York City system of medical examination described the methods in use and proved their usefulness by telling how one year after their introduction ninety-eight per cent of those formerly excluded were allowed to stay in school under the nurses supervision. The president of the Illinois State Board of Charities advocated more restriction in the freedom of marriage as a means of preventing juvenile delinquency and other factors that increase the wards of the state. He favored a law forbidding persons to marry who cannot show a certificate of good health and a good heritage. Judge Lindsey of Denver and Dr. G. Stanley Hale of Clark University were among the many other speakers, each of whom brought forward his own particular point of view and helpful suggestion from personal experience.

Perhaps the real significance of the fact that so much juvenile desertion of school is a reflection on the school has not before been so clearly brought out. It was appropriate that this study was initiated by the Board of Education, for the final finding must be that the ranks of truancy are swelled because our schools are so crowded that no teacher can give proper individual attention to the pupils; because our curriculum is neither rich nor elastic enough to provide for the varying needs of different types; and because teaching is not always looked upon as perhaps the highest profession that exists.

The tremendous gravity of these deficiencies in the school is even more clearly apparent when we consider that it is not only upon truants that they bear. They must bear as heavily, perhaps even more so, upon the hundreds of thousands of other children who continue to sit patiently at their desks, accepting without question the environment in which they are placed. There will be a two-fold gain in every step toward betterment of the existing condition of things.

ABSTRACTS

Albuminuria and Nephritis in Early Infancy.—BALLICO (Rivista di Clin. Pediat., 1905, No. 10; and Gazz. Med. Ital., 1905, No. 50, p. 498). Ballico reports his observations on seventy infants during their first year, suffering from various complaints, and in twenty-three of them noticed renal complications, *i. e.,* in 32.8 per cent. In three cases he found simple albuminuria. Most cases occurred during gastro-intestinal affections—ten in thirty—which fact he explains by supposing that the toxic substances which are continually accumulating in the intestine must be eliminated by the kidneys, which for a certain time and in a certain measure effect this; but when too much is thrown upon them they become exhausted and react, and thus is produced simple albuminuria in some cases, but usually a true acute renal inflammation. Another question discussed is that of the existence of renal change without albuminuria, the importance of which is evident when one considers that its admission implies that a simple chemical examination of the urine is not sufficient for an exact diagnosis. In medical literature cases of chronic nephritis without albuminuria are relatively frequent, proving that no constant relation exists between the quantity of albumin and the degree of renal lesion, or even, according to Dieulafoy, that albuminuria is not a reliable symptom for the diagnosis of nephritis, as it may be temporarily or entirely absent. Absence of albumin may even occur in acute renal inflammation. Philipps, in an epidemic of scarlatina, observed cases in which albumin was absent and nephritis found at the autopsy, and Henoch a case of scarlatinous anemia without albumin or casts where nephritis was found. Ballico, out of the seventy urines examined, in four instances could not find the least trace of albumin, although examination of the sediment showed renal cells and casts, and in two cases red blood cells and leucocytes. These four infants, aged 33 and 42 days and 7 and 12 months, suffered, one from rickets, two from dyspepsia, and the other from both these; they had no edema anywhere, nor any manifest objective lesion or antecedent illness to cause any suspicion of renal alteration; the probable diagnosis of nephritis had to rest alone on the microscopical examination of the sediment. Cavazzani and Ferrarini, experimenting with intra-peritoneal and subcutaneous injections of chloral and pyrogallic acid, confirm the possibility of the existence of serious lesions of the renal epithelium without albuminuria, and consequently these lesions are not alone sufficient to cause the passage of albumin into the urine, and therefore its absence does not authorize an absolute exclusion of anatomical lesions of the kidney. There are cases in which, notwithstanding repeated examination of the urine, neither albumin nor morphological elements are found. There is no doubt but that both may be temporarily absent at the same time and make their appearance suddenly only in the last days of the illness at the commencement of anemic symptoms. This clearly shows the importance of accurate and systematic examination of the urine in infants, specially when one thinks that a large number of cases of chronic nephritis diagnosed *à frigore* in adults are only the after-effects of a toxic or infective complaint of infancy. The author considers that renal complications in the first year of life are very frequent on account of the incomplete structural and functional development of the kidney, and of the ease with which this organ is exposed to work that is incompatible with its delicate structure; that in the majority of cases the renal lesions are determined by affections of gastro-intestinal origin, which in young infants are very frequent and somewhat serious; that sometimes they are revealed by a simple albuminuria, but generally examination of the urine shows the existence of a true nephritis; that renal changes may exist without the least trace of albumin and without any objective symptom to call attention to it.

The Effects of Chronic Enlargement of the Tonsils.—Gardner (Lancet, September 30, 1905). Gardner maintains that chronic obstruction to respiration, even if purely mechanical and situated in the upper air passages, may produce a certain degree of those effects commonly attributed to obstructive lung and heart diseases. We have here a retardation of the venous circulation, with consequent engorgement of the systemic veins and limitation of the oxidation processes in the lungs. Gardner says that there is a particular type of youth with varicose veins, and in whom no obvious cause can be found for their appearance. He is usually about twenty years of age, thick-set, of middle height, and somewhat powerful built; he is florid in complexion and full-throated. If ether is administered, such a patient exhibits extremely labored breathing, cyanosis, and excessive secretion of mucus. If the throat be examined, considerable chronic enlargement of both tonsils or of one tonsil will be found. The chronic obstruction to free respiration produced by the enlarged tonsils produces a certain degree of chronic enlargement throughout the systemic veins, and hence gradual dilatation of the veins in the legs takes place. So, too, in many cases of hernia, where the chief causative factor is increase in intra-abdominal pressure. The latter may very readily be brought about by chronically enlarged tonsils. Gardner has anæsthetised patients suffering from hernia where there was considerable tonsillar enlargement, and during their convalescecnce he has observed their breathing during sleep. Such patients snored deeply and exhibited very marked jerky abdominal movements, proving only too clearly how the hernia had been forced down by the continuous action of obstructed respiration.

Membranous Colitis.—White (Lancet, Oct. 28, 1905). In an interesting paper on the study of sixty cases of this disease, the author reports that only one of these occurred under the age of ten years. The case was that of a girl, aged 4 years. She had no pain or tenderness, but for two years before she was first seen she passed huge tubular casts from the bowels every time they were opened, and she was constipated. She was pale and languid and increased very slowly in weight. She never passed any blood, and otherwise appeared perfectly well. Her surroundings were the best possible, but neither castor oil, nor high-frequency treatment, nor any particular form of dietary appeared to better the disease. Out of Van Noorden's series of seventy-six cases four were children. The writer of this article refers to constipation as being by far the most important fact in connection with the bowels in these cases, and mentions neurasthenia as the prevailing element associated with the disease. By far the most important part of the treatment is to keep the large bowel empty. The simplest way to do this is by aperients, and in many cases castor oil by the mouth will cure the patient. It is best given in the early morning as soon as the patient wakes. If this produces nausea, sulphate of magnesium may be tried instead, or, if this is unsuitable, calomel may be given at bedtime. Should these methods fail, the large intestine should be kept empty by washing out with plain water at a temperature of 100° F.

Xanthoma Diabeticorum in a Boy, Aged 16 Years.—Proctor (Lancet, Nov. 11, 1905). The author records a unique case of diabetes mellitus attended by xanthema. The rash was papular in character and was chiefly confined to the extensor surfaces of the upper extremities, to the flexor and extensor surfaces of the lower extremities, and to the buttocks. On the knees, elbows, and buttocks the papules were very numerous and often confluent. They were roundish, and well defined in outline when discrete. They were hard to the touch, bluish-red in color, and at the apex of most of them was a yellow head which appeared to contain pus, but which on puncture revealed solid yellow matter. Isolated papules were present practically all over the skin and on the tongue and mucous membrane of the mouth. The eruption appeared rather suddenly, and was first noticed on the knees and elbows. It was not painful, but itched very much. There was tenderness on pressure, and sitting, except on a soft cushion, was attended with much discomfort. From time to time some of the papules disappeared, and were succeeded by fresh crops.

A Case of Diaphragmatic Hernia.—Cautley (Lancet, Nov. 18, 1905). The author had recently under his care a female infant, aged 4 months, who was admitted into hospital for consolidation of the right lung. When seen in the Out-Patient Department on the day of admission there was marked recession of the chest wall, dulness over the right base, dyspnea, and cyanosis. When examined in the ward two hours later she appeared to be in a normal condition. She was a mouth-breather, had little cough, and the appetite was good. There was recession to an equal extent on both sides of the chest, a resonant percussion note all over, weak breath sounds over the right base, and scattered rhonchi. She had nasal obstruction, due to adenoids. Under ethyl chloride these were removed. She breathed better afterwards, but the recession of the chest remained as before . Four days later there was vomiting, and abdominal distension became marked. At night, while being fed, the infant had an attack of dyspnea with cyanosis, and became much collapsed. Two days later a similar attack took place, after which partial dulness and weak breath sounds were noted over the right base and axilla. As the dulness became absolute, an exploring needle was put in, but without result. Next day the symptoms persisted, and physical signs were now found on the left side. The vomiting continued. On the following day the note over the right chest behind had improved, the vesicular murmur was weak but distinct, and numerous rhonchi were heard on both sides of the chest. That evening collapse occurred and she died. At the post-mortem the diaphragm was found to be depressed, and showed a rent on the right side which allowed three fingers to pass easily. The hernial contents included all the large intestine and the greater part of the small intestine, the small lobe of the liver, the gall-bladder, and a part of the pancreas.

Traumatism as a Case of Appendicitis.—(Lancet, Nov. 25, 1905). F. A. Southam makes some very pertinent remarks on this subject in a paper read before the Manchester

Medical Society. Deposits of inspissated fecal matter, or even calcareous concretions, may be present in the appendix for a considerable time without causing any symptoms; but if violence is applied to the abdomen in the region of an appendix containing a fecal concretion it can readily be understood that the wall of the appendix at this spot, probably already somewhat damaged by the presence of the concretion, then becomes so injured that it suddenly ruptures, or an attack of acute inflammation is set up which may quickly terminate in ulceration and perforation. It is also possible that an appendix which is completely stenosed at some point in its course, and distended beyond with a mucoid or muco-purulent fluid—a condition which is not at all uncommon—may suddenly rupture as the result of violence applied to the abdomen, and its contents become extravasated into the peritoneal cavity. It is also probable that without the application of any direct violence traumatism may excite an attack of appendicitis in another manner: *e. g.*, a severe strain, by causing a sudden and forcible contraction of the abdominal muscles, may separate or break down adhesions between the appendix and the abdominal wall, causing an extravasation of blood either into or around the appendix, or possibly producing a rupture of its wall, thereby allowing its contents to escape.

Nocturnal Polyuria and Incontinence in Early Renal Tubercle.—Bazy ('La Tribune Médicale,' Nov. 4, 1905). The case of a girl, aged 16 years, was narrated before the Société de Chirurgie of Paris on October 25, whose first symptoms of renal tubercle were the passing of an excess of urine during the night, accompanied by incontinence. It is pointed out that this combination of symptoms occurs in renal disease before any physical signs can be discovered by instrumental examination of the bladder or kidneys. They should arouse a suspicion of renal disease. Pale-colored, cloudy urine indicates a late stage of tubercular nephritis, being due to the presence of caseation.

A Case of Pyloric Stenosis in an Infant.—Dr. John W. Keefe reported the following case to the Providence Medical Association at a recent meeting. The patient was a male infant, born May 31, 1905. He appeared to be a strong, perfectly well developed child, weighing eight and one-quarter pounds. By June 11 he weighed eight and one-half pounds, but from this time he commenced to lose weight rapidly. He vomited the mother's milk from the first.

June 19 he was given modified milk and later barley water, koumiss, etc. June 21, Dr. J. W. Mitchell, the attending physician, called Dr. E. F. Walker in consultation and the next day the patient was also seen by Dr. Charles Putnam, of Boston, who said that the patient was either suffering from improper food or a stenosis of the pylorus. A wet nurse was then employed, but the vomiting continued. The vomiting occurred shortly after the ingestion of food and was projectile in character. The vomitus consisted of milk and mucus, no bile being present.

Dr. Keefe first saw the infant June 24, 1905. He was then three and one-half weeks old and weighed 6 lbs. and 12 oz. He was fretful most of the time, but after emptying the stomach he seemed relieved and would go to sleep. Upon waking he was greedy for food. His bowels moved freely and lately the stools were greenish in color with very offensive odor. He was very much emaciated. There was visible peristalsis of the stomach, the latter being distended. No tumor could be felt. Immediate operation was resorted to. Dr. Miller anesthetized the patient with small quantities of ether.

A median incision two inches long, beginning just below the ensiform cartilage was made, revealing a non-adherent hard pyloric tumor, about the consistency of gristle, measuring 3 c.m. in length by 1 c.m. in diameter. The stomach was hypertrophied and the intestine collapsed. A Loreta operation was decided upon, as the infant was so frail and it was doubtful if he could survive a gastro-jejunostomy which would of necessity be more prolonged.

An incision was made in the pyloric end of the stomach and through this opening graduated sounds were passed until the peritoneum covering the stenosed portion separated in a longitudinal direction for the distance of 1 c.m. The ends of this slit in the peritoneum were united with a Pagenstecher thread as in pyloroplasty. The opening in the stomach was closed with interrupted Lembert sutures and the abdominal wall closed in layers. Saline enemas were given and rectal feeding commenced shortly after the operation. Within an hour he suffered severely from shock and was given minute doses of strychnia. He was given the wet nurse's milk with the aid of a medicine dropper.

June 29 the stitch in the skin was removed, and on July 3 an intramural abscess was opened, which healed in a short time.

July 15 he weighed 7 lbs., 5 oz., although he continued to vomit considerably. He was again seen by Dr. Putnam with Dr. Mitchell, and the former advised gastro-jejunostomy unless he improved.

July 20, another wet nurse, a negress, nineteen years old, was employed. Her milk agreed perfectly and the vomiting ceased. Six days later the weight was 8 lbs., 3 oz. Some weeks later in August one pound a week was gained. Weight October 30, 17 lbs., 5 oz. Weight December 30, 19 lbs. 14½ oz. During the latter part of December two teeth appeared.

January 28, 1906, the weight was 19 lbs., 1 oz. Two weeks ago it was thought advisable to wean the child. Modified milk was given, consisting of cow's milk, sugar of milk and lime water. This was immediately rejected while the wet nurse's milk was retained, even when from three to nine ounces were taken at one feeding, showing that the quality of the food and not the narrowing of the pylorus caused the vomiting and the diminution in weight.

Raynaud's Disease in Children.—Comby (Arch. de Méd. des Enfants, VIII, 1905). This rare disease has been observed to occur in children also. The author reports the cases of three children, aged nine and ten years respectively, in whom the characteristic symptoms were present in shape of local asphyxia and dry gangrene at the ends of the extremities, or the ears. The accompanying pain may be very severe. All three children were very nervous individuals, and the attacks of local syncope were occasionally originated by psychical factors. The disease was observed to affect these children during the cold season of the year only. The condition was, however, sharply differentiated by the author from chilblains and skin disease referable to cold. An ultimate cure may be anticipated with suitable management of similar conditions.

Edema During Infantile Gastro-enteritis.—Rocaz (Gaz. Heb. des Sciences Méd. de Bordeaux, Nov. 5, 1905). Edema occurs in the subacute form of entero-colitis, characterized by slight recurrent diarrhea alternating with constipation, the motions being fetid and containing mucus, the abdomen sunken and tender; the colon is felt to be hard and contracted; vomiting is frequently present. Edema is also noticed in enteritis, with elevation of temperature, coated tongue, and vomiting; the motions are soft, colorless, with an ammoniacal odor, the abdomen distended. The intestinal disturbance is often associated with congestion at the bases of the lungs, and with cerebral symptoms simulating meningitis. When there is copious diarrhea, edema is rare. The edema is due to retention in the system of chloride of sodium, and is associated with deficient renal secretion. The deficient secretion is sometimes due to renal disease; the albuminuria may be so fugitive that it may escape notice unless the urine is frequently examined. In other cases there is renal insufficiency and a scant secretion of urine. The practical conclusion is that, as this edema is due to retention in the system of chloride of sodium, caution should be exercised in using normal saline injections when there is but little diarrhea or the urine is scant, especially if there is nephritis, or if edema is already present. The treatment consists in administering bland drinks, sugar of milk, and theobromine. The swollen parts should be wrapped in cotton-wool and the digestive trouble treated by repeated purges.

Megalerythema.—A. Moussous.—(Gaz. Heb. des Sciences Méd. de Bordeaux, Dec. 10, 1905). Three cases were seen in June. A boy of twelve had a rash which first appeared two days before, accompanied by slight disturbance of the general health and some discomfort in the throat. The face was uniformly red, hot, and slightly swollen (especially the cheeks). The nose, the neighborhood of the mouth, and chin were exempt, the rash was bounded by a wavy margin at the temples and ears, it did not extend to the neck. On the back and front of the trunk there were a few patches the size of a five-franc piece, slightly raised, bright red in color, with well-marked margins; in places the patches had united so that their edges were polycyclical. On the arms and legs the patches were more numerous. Pressure with the finger caused the color to disappear temporarily. The affected parts neither pricked, burnt, nor itched; there was, especially on the face, a slight feeling of tension and heat. The condition of the hands and feet resembled that of the trunk. The pulse and temperature were normal; nothing unusual was seen in connection with the mouth, throat, or conjunctiva. There was no running from the eyes or nose, the voice was normal, there were no râles in the chest and there was no enlargement of the lymphatic glands. Next day the rash on the face was paler; on the limbs the areas had faded at their centers, leaving more or less complete circles. In a few days the face cleared, while on the limbs, wavy lines were the final stages of the patches. At various times the rash, which had almost faded, returned (when the patient was warm in bed or from extra exertion). The rash disappeared in a week, nine days after its first appearance, and there was no desquamation. The viscera were normal, the urine was repeatedly examined and was always found to be normal. Ten days after the rash appeared on the boy it appeared on a sister, without any fever or feeling of ill health; the course of events was similar: the rash on the limbs first appeared on the parts near the trunk, and later the more distal parts were affected. A servant in charge of the children became affected eight days after the second case. The author considers the condition a distinct morbid entity, intermediate between the infectious erythemas and the eruptive fevers. Various names have been given to this erythema, acute infectious, simplex, marginatum. The author refers to his paper in 'Archives des Méd. des Enfants,' 1901.

The Plantar Reflex and Babinski's Phenomenon in 1,000 Infants.—Engstler (Wien. klin. Woch., 1905). In the newly born, especially in premature children, dorsal flexion is the almost universal rule; in the third year of life plantar flexion is found as the frequency of dorsal flexion diminishes by 50 per cent. at the end of the first year. During the transition period the reflex is often proved to be absent, notably during the second year. Babinski's sign is only of importance after the second year. According to Bickel the more the cerebrum predominates in the reflex mechanism the more the original dorsiflexion reflex will become modified and produce plantar flexion, and it is interesting to note that in the adult during sleep dorsal flexion may occur.

Lobar Pneumonia Mistaken for Appendicitis.—Emans (The Post-Graduate, December, 1905). The author relates the case of a boy aged 5½ years, who was taken ill with slight fever and developed a general erythematous eruption and slight thoracic pain; this pain, after twenty-four hours, moved to the abdomen, which was tender, but without any rigidity of the rectus muscle. The chest was examined, but nothing abnormal discovered. Another physician stated the disease to be appendicitis and the abdomen was opened, but all the viscera were normal. The day after the operation, which was the third day of the illness, signs of pneumonia appeared at the apex of the right lung; this ran a normal course, but it was followed by empyema, for which resection of a rib was performed. The above type of case is not by any means unusual, but it emphasizes again the necessity of repeatedly examining the chest in cases where abdominal symptoms are present which may possibly be due to thoracic disease.

Lumbar Puncture, and Circumscribed Meningitis.—Grossmann (Archiv. für Ohrenheilk, Vol. 64). The author reports some cases which serve to show that positive findings in lumbar puncture do not invariably assure the diagnosis of diffuse purulent meningitis. According to him, the mere absorption of toxic substances may considerably modify the composition of the cerebro-spinal fluid, at the same time simulating the clinical symptom complex of diffuse purulent meningitis. The doubtful curative value of lumbar puncture is shown by a case discussed by the author, in which the operation led to findings which made the existence of purulent circumscribed meningitis practically positive, and which was cured without lumbar puncture, simply by ablation of the primary focus in the temporal bone.

Carcinoma of the Penis in a Child.—Creite (Deutsche Med. Woch., June 1, p. 894). A boy, aged 2, was admitted to hospital, with a history of persistent priapism of eight days' duration. There was a penile tumor, which had previously given rise to no symptoms. When the penis was amputated, and the corpora cavernosa were extirpated, it was found that the latter were completely and uniformly filled with hard masses of tumor, of a whitish-gray color. The posterior half of the corpus spongiosum was also involved. In the perineal region the two corpora cavernosa and the corpus spongiosum were bound together by the tumor and formed a solid mass of the size of a walnut. The tumor was a large celled carcinoma, the cells being arranged partly in tubes and partly in wide, solid cords. Its starting point could not be determined with certainty.

Infant Feeding.—T. S. Southworth (Journal A. M. A., Oct. 6). The author reviews the data and theories of the artificial feeding of infants and considers the importance of the casein constituents, the effect of acids on milk, the process of intestinal digestion, the value of artificial foods and food formula, etc. Many of the difficulties experienced are due, he thinks, to non-application of certain broad principles, and especially to the difficulty of knowing whether the difficulty lies in the digestion of the proteids or the fats. The usual schedules for feeding at the different ages may do for the fairly normal child, but to make an infant with disturbed or untrained digestion take the amount of casein in the food usually scheduled for its age is folly. The lower formula must first be tried and the stools; a weight chart and the infant's behavior are the guides to direct successful feeding. The most carefully planned percentage methods are also often fruitless because of overfeeding and improper intervals.

Whole Milk vs. Laboratory Milk.—A. McAllister (Journal A. M. A., Oct. 6). The author points out that laboratory milk, understanding by the term every form of milk other than raw cow's milk or fresh cow's milk diluted and warmed to about 100° F., is in everything but its chemical composition, very far from being a duplicate of mother's milk. It lacks the living principle. The natural ideal substitute is fresh cow's milk, and drawn and handled with the care demanded by laboratory standards; cooled at once and kept cool, it possesses all the important vital constituents. Such certified milk can be supplied, he declares, if the public demands it.

Meningitis in Infancy.—J. L. Morse (Journal A. M. A.). The diagnosis was made in every case by autopsy or lumbar puncture. A marked predominance of mononuclear cells in the spinal fluid was considered diagnostic of the tuberculous form, and of polynuclear cells of the cerebro-spinal form. The meningococcus was found in all but three of the cerebro-spinal cases. His careful analysis of the symptoms shows quite a different picture from the usual one given in the text-books; in only four of the cerebro-spinal type was there the usually looked for sudden onset and in seven of them there were no symptoms pointing directly to the nervous system until after several days or two weeks. On the other hand, the onset was sudden, with convulsions or stupor in four of the tuberculous cases. The short duration in many of the tuberculous cases and the long duration of many of the cerebro-spinal cases was also very striking. The tuberculous form has a more sudden onset and a shorter course than in the adult, and the symptomatology of the two types is essentially the same, there being only a slight predominance of signs of spinal and to a less extent of cerebral irritation, in the cerebro-spinal form, but not enough to justify a differential diagnosis. A positive diagnosis between the two forms is impossible by the symptoms alone, and can be made only by examination of the cerebro-spinal fluid obtained by lumbar puncture. A high leucocytosis may be present in tuberculous meningitis, as well as in the other form, though not so characteristic. The history of the case is of value in making the diagnosis, but it is often wanting. Lumbar puncture has no curative value in cerebro-spinal meningitis, but is very useful for the relief of symptoms in both forms. Twenty cases of each form, all in patients in the Infant's Hospital, Boston, furnished the material for the study.

Mental Strain for Children.—Czerny (Deut. Med. Woch.). Czerny thinks that people exaggerate the importance of "school strain." They ascribe to the school what is really the result of the home environment. The mental strain is intense during the years before the child enters the school if it is much with adults. It is constantly asking questions and learns something from each answer, but no one thinks of measuring or shortening the hours of this activity of the child's brain. Adults sometimes answer a child's questions all day long and merely rejoice in its inquiring little mind. In this way the child soon grows out of its childlike naiveté, and signs of neuropathy develop which are falsely ascribed to "school strain" after the child enters school. The most effectual remedy is to allow children to grow up in the companionship of children, and to reduce their association with adults to the minimum. When children play together the demand for toys and change of amusements is much less than for one child alone, and there is also the possibility of many harmless games and of cultivation of the will. Children playing together have red cheeks while the child associating with adults does not get the same exercise and is pale. This pallor is a sign of mental strain. The excitement that reddens a child's cheeks is harmless. A child with a private tutor has to pay stricter attention in one hour than during the four hours of a public school, and he has more unoccupied time. This aids in developing a neuropathic tendency. The meals, the bath, etc., become important events. Symptoms of hysteria frequently develop in such children in connection with some bodily function.

Recurrent Attacks of Cyanosis in Infants.—MONRO (Montreal Medical Journal, 1906). The author describes two cases in infants under one month old. The attacks of cyanosis recurred at irregular intervals, and lasted from five to thirty minutes each, and there was cessation, more or less complete, of respiration. Both cases were treated by artificial respiration. As to diagnosis, the possibility of some cerebral lesion, laryngismus stridulus, and patent foramen ovale were considered, and also tongue swallowing. On the whole, the author inclines to the view that they were cases of "congenital atelectasis," and quotes from Emmet Holt's account of the disease. Some interesting questions are raised by these cases: (1) Why should the cyanosis come and go? (2) Why, when the child is suffering from lack of oxygen, should respiration be discontinued? Morrow suggests that as part of the lung is in a state of atelectasis, the remaining part will tend to be over-distended when the chest expands; this over-distension may act as a stimulus to the inhibitory nerves of the respiratory center and bring about cessation of respiration and consequent cyanosis.

The Varieties of Infantilism.—G. ANTON (Munch. Med. Woch., July 24, p. 1458.) Infantilism is usually the result of various diseases of childhood or puberty. Lorrain understood by infantilism, a debility, slightness, and abnormal smallness of the body, i.e., a disturbance of development which affected the whole organism rather than any particular organ. But subsequently cases of local or partial infantilism have been described. Manouvrier defined it as an arrest of development between the ages of 15 and 16. But this definition includes only those cases in which infantilism becomes obvious at puberty, whereas in a great number of cases abnormally slight development and growth is in early evidence; even dwarf fœtuses occur. The writer defines general (as opposed to local) infantilism as a development defect which results in retention of an infantile type by the whole organism with arrest of sexual development. Not only the bodily but to a great extent the mental attributes of a child characterise the subjects of infantilism through adult life up to old age. The chief peculiarities of general infantilism are: abnormal slenderness of the skeletal system with proportional smallness of the viscera; absence or weakness of sexual power with ill-developed genitals; and mental development corresponding to that of a child. Apart from the forms of partial infantilism, the general form includes many degrees and types, which point clearly to a different etiology

Thyroidectomy of young animals regularly leads to dwarfishness, atrophy of the genital organs, and deficient intelligence. Both ante and post-natal diseases of the thyroid gland are important causes of infantilism. The question as to the identity of endemic cretinism with sporadic infantile myxœdema is not yet settled. Lately many authorities, among them Herthoghe, have claimed that there is no difference between simple dwarfishness and cretinous dwarfishness, and have attributed all forms of infantilism to defective thyroid function. The various diseases—such as congenital syphilis, malaria, alcoholism, and tuberculosis—the early acquisition of which is usually named as a cause of infantilism, in their opinion, only leads to it if the thyroid gland is previously diseased. Sanctis and others have, however, proved that both slight and marked infantilism may occur when the thyroid gland is intact. The writer in 10 years' experience in a goitrous district has noticed that in families in which cretinism is common infantilism without goitre is unusually frequent. This observation by no means excludes the possibility of other diseases during the period of growth producing infantilism.

Infantilism may be due to defective or abolished function of other glands, e.g., the testicles. It is well known to breeders that the result, as regards development, differs greatly according as to whether the reproductive glands are removed soon after birth or after growth has ceased. Evidently the reproductive glands, although before puberty sexually useless, influence growth and development by an internal secretion. The same result occurs in man if the testes are early destroyed by congenital syphilis (castratio subalbuginea) The suprarenal bodies also have an important influence on the development of the brain. In all of 56 abnormal fœtuses, examined by Zander, which included 42 hemicephalic, 4 cyclopic, and 3 syncephalic monsters, 1 microcephalic fœtus, and 6 encephaloceles, the suprarenal bodies were abnormally small or degenerated. In all cases also of extensive defects of the frontal lobes the suprarenal bodies were abnormal. Three necropsies made by the writer on anencephalic fœtuses confirmed these statements. There is also evidence that the thymus gland influences development. In a case of cerebral hypertrophy there was complete cystic degeneration of the suprarenal bodies, but the thymus gland and the thymic arteries were abnormally developed. The thyroid gland was normal. A young man—a member of the same family—ceased, after a certain time, to develop mentally and eventually became mentally defective. Persistence of the thymus gland was rendered probable by percussion. Klebs connects the thymus with acromegaly, but the causes of a persistent thymus are little known. It is only certain that a persistent thymus is relatively common in cases of infantilism. In young animals, in which the gland has been excised, the skeletal system is lighter than in control animals of the same age, and less callus is formed after fracture of the bones. The relation of the pituitary body to bony development requires no comment. Pancreatic infantilism has also been described. These considerations show that the glands, with an internal secretion, all have an important influence on growth and development. Whether this common action is of a chemical or physiological nature, or depends on reflex nervous impulses, it is impossible to say. Prof. Anton's view is that the inhibition of development may depend on metabolic abnormalities of various origin. But each abnormality appears to produce a distinct type of infantilism. Two little recognized causes of infantilism are injury and primary cerebral disease. Thus after an accident—especially if it is followed by shock—a child may remain all its life at the stage of development in which it was when the injury occurred. Brain and glands mutally influenced one another; the action of the former on the latter is as evident as it is on the muscular system. The brain also influences the growth of other organs including the skeletal system; this is especially noticeable in infantile cerebral diseases, such as encephalitis, porencephalus, and progressive paralysis. Microcephaly does not necessarily lead to arrest of development of the rest of the body. The following classification of infantilism is based on etiology:

(I.) General infantilism.

(1) Infantilism with myoxœdema and cretinism.

(2) Mongolism.

(3) Infantilism through absence or poor development of the genital organs.

(4) Infantilism with primary disease of other glandular structures, especially of the suprarenal bodies, thymus, and pancreas.

(5) Dystrophic infantilism which includes etiologically the following sub-groups:

(a) Infantilism with aplasia of the vascular system (anangioplastic infantilism).

(b) Infantilism with primary cerebral disease (unilateral or bilateral).

(c) Infantilism in inherited syphilis.

(d) Infantilism with alcoholism or other intoxication, e.g., lead or mercury poisoning of the parents.

(e) Infantilism which depends on the early acquisition of certain diseases or metabolic defects, such as tuberculosis, chlorosis, cardiac disease (especially pulmonary and mitral regurgitation), pellagra, and endemic diseases.

(f) Infantilism due to bad hygienic surroundings and insufficient food.

(II.) Partial or local infantilism.

(1) Infantilism consisting in smallness of the sexual organs.

(2) Infantilism consisting incardio-vascular defects.

(3) Infantilism of the voice-producing organs with childish voice.

(4) Defective growth of hair (of beard, pubes, and other parts of the body) with good bodily development.

(5) Uncomplicated primary psychical infantilism.

The Prognosis of Tetanus Neonatorum and Infantum, and Its Relation to Serotherapy.—Flesch (Dtsch. Med. *Wchschrft.*, No. 5, 1905). Upon the basis of a number of cases treated in the Stefanie Hospital for Children, in Budapest, together with the statistical reports of other clinics, the author arrives at the following conclusions: Tetanus occurring in children has a much more favorable prognosis than in adults. This is especially true for tetanus infantum. With special reference to tetanus neonatorum, the author agrees with Fronz to the effect that the prognosis is not as absolutely bad as is usually assumed. Several factors seen to indicate that the fatality of tetanus infantum diminishes in cases treated with serum, from 40-50 per cent. to 15-20 per cent., according to the author's calculations. No appreciable advance in this direction has been determined for tetanus neonatorum. A definite verdict can only be derived from a large number of accurate observations. In order to obtain the proper point of view, the separate consideration of statistics illustrating the value of anti-toxin in tetanus neonatorum, tetanus infantum, and tetanus of adults, is an essential requirement.

Operation in Infantile Scurvy.—H. RIESE (Deutsche Med. Woch., May 1906). Infantile scurvy (scurvy rickets) is usually of interest to physicians rather than surgeons. But the formation of hæmatomata may give rise to serious mistakes in diagnosis. The disease is frequently mistaken for acute articular rheumatism because the subperiosteal swellings are usually situated in the neighborhood of joints. Heubner states that he once saved a limb which a well-known surgeon was about to amputate on the assumption that the swelling was a sarcoma. The disease may also readily be mistaken for acute osteo-myelitis, as is illustrated by the following case:—

A boy aged 14 months, was brought to the writer's clinic with the diagnosis of "acute multiple osteo-myelitis," for which a surgeon had advised operation. The temperature was about 104° and the diaphyses of the right femur and right tibia near the knee-joint were greatly swollen, and so painful that the child kept absolutely still, though constantly moaning. At first the writer thought of osteo-myelitis, but a single glance at the mouth, with its bleeding gums, cleared up the diagnosis. Further examination showed that the swellings were entirely confined to the bones and periosteum and did not, as is usual in osteo-myelitis, involve the deeper muscles. As the child had not slept for days and refused nourishment the writer made 2 small incisions—one above and one below the knee—down to the femur and tibia respectively, gave exit to a large amount of liquid blood, and lightly packed the subperiosteal cavities. Extreme tension of the periosteum was evidently the cause of the pain. Immediately after the operation the child appeared comfortable. The pyrexia subsided and on the third day the temperature was normal. The wounds rapidly healed and in 3 weeks, with a suitable diet, the child was perfectly well.

The writer admits that the disease might have been cured without operation, but is convinced that the latter accelerated recovery. Some authorities state that an operation in infantile scurvy is contra-indicated owing to the liability to secondary hæmorrhage and unsatisfactory healing. Operations not connected with the disease—such as circumcision—should be postponed, but small incisions of a hæmatoma are certainly admissible. Thus Zuppinger successfully incised a large cephalhæmatoma. The pain is undoubtedly largely due to tension of the periosteum and is at once relieved. Pyrexia will probably also subside if, as the writer believes, it is due to absorption of aseptic blood. That this is so, appears to be proved by the facts that no micro-organisms have hitherto been found in infantile scurvy and that in cases in which no large hæmatomata develop, pyrexia is absent. If an operation is performed, a small incision, with subsequent packing, is preferable to puncture with a hollow needle, as with the latter method secondary hæmorrhage into the sac may occur.

Health of School Children.—L. H. GULICK (Medical Record. July, 1906). The various subjects of ventilation, heating, purity of air, lighting, vision, seating, scoliosis, overstudy, feeble-minded children, defective children are discussed in relation to the health of school children. The author formulates certain ideals toward which he believes that additional progress should be made with reference to their health. There should be individual care, personal inquiry into, and knowledge of the home life of approximately the lower tenth of every class. There should also be consecutive records of all children as to age, height, weight, eye, ear, nose, throat, heart, lungs, and so on. The size of classes should be decreased. There should be an open-air playground within walking distance of each child. Special classes and schools should be organized for defective children of all kinds. The most serious obstacle to progress is the lack of informed public opinion concerning the necessities of school children.

Physical Care of School Children.—R. G. FREEMAN (Medical Record July, 1906). An ideal private school should be out of town, but within easy reach of the homes of its patrons. There should be short periods of study, frequent recesses, and ample time for a substantial midday meal. After this the children should play out of doors. The ideal public school should care for the children as many hours a day as is practicable. Out-door play should precede study. Nutritious food should be furnished the scholars at noon. The harder work should come during the morning hours; in the afternoon the easier subjects, the manual work, and preparation for the next day should occupy the time. There should be opportunity for out-door exercise under supervision until late afternoon. In every school strict examination should be made for any evidence of contagious diseases. All children with colds and contagious eruptions should be excluded from school.

Blood Pressure in Infants.—TRUMPP (Jahrbuch f. Kinderheilkunde, lxiii). The conclusions here given are based upon 1,300 measurements of the blood pressure in healthy and sick infants, using Gærtner's tonometer without disturbing the infant in any way. Trumpp wished to learn if measurements of the blood pressure might serve as an indicator of whether or not increase of weight was due to normal growth or to the retention of water. His experience in 2 cases seemed to confirm this last assumption, the blood pressure falling and rising abruptly, parallel to weight.

Sarcoma in Vagina in Childhood.—ROLLIN (Revue de Gynecologie, X, No. 1). We have here summaries of 12 cases of sarcoma developing in the vagina of girls under 8. In some the tumor was noticed soon after birth. The first symptom was generally bleeding from the vagina, but sometimes there were pains and disturbances in urination and defecation, and occasionally the protrusion of the tumor was the first manifestation of its existence. The course of these tumors in children is essentially rapid. Death is soon entailed by the local extension of the tumor and the resulting cachexia. Metastases at a distance are rare. The duration varies from one to eighteen months. The prognosis is grave, as the diagnosis is generally not made until too late for relief from operative measures. Recurrence is the rule, and with exception of Schuchardt's and Hollander's successful cases, the children soon succumbed to recurrence. Tumors in the vagina in childhood are almost always sarcomas. Any symptoms calling attention to the genital sphere in children should be regarded with suspicion. Physicial examination is the only means of detecting the neoplasm. In children the sarcoma usually develops as a solitary bunch at first, assuming the bunch-of-grapes form later. The structure of the peripheral portions may differ from that of the base of the tumor. It may be mistaken for a harmless growth on this account.

Cold Baths for Fever in Children.—O'DONOVAN (St. Louis Med. Review, July, 1906). In spite of admitted drawbacks to method of treatment, the writer advises the use of cold baths, in children, even infants, whenever the high fever and flagging powers point to the possibility of an independing collapse; and the child is to be tubbed not once only, but whenever the same symptoms return in different severity to call for treatment. His opinion is based on clinical results. He suggests that in the convulsions of young children the proper treatment should be a cold rather than a hot bath to reduce the fever, which often is found to exist when the rectal temperature is taken, and to calm the over-excited nervous system of the child. As every child may not be able to stand the severe shock of a cold bath, O'Donovan advises that the physician himself give the first bath, or stand by while it is being given, to note its effects on the child. Terror and fright, even manifest physical suffering from the cold, are not bars to its usefulness. Cyanosis and failure to respond to the shock by crying and struggling are signs of evil to be looked for and feared. Under these circumstances the bath must be stopped, the child wrapped in blankets, and stimulated with whiskey or digitalis. The length of time to keep a child in the bath is to be judged by its effects on the patient and the result aimed at. A short dip suffices for a stimulating shock, whereas three or four minutes may be required to check a high and rising fever.

Prevention in Children of Disease in the Adult.—Batta (Gazetta degli Ospedali, June, 1906). The author would call attention to the great importance of detecting the tendency to certain affections in their early stages and curing them before they become irreparable. Scoliosis, for instance, is seldom diagnosed until the deformity is well established. Spasms in a child are attributed to worms or other causes, not to latent epilepsy, until when grown to adult age he has the typical epileptic seizure. Bronchial asthma in the adult may have been heralded by slight asthmatic disturbances in the child to which no one paid attention. If the course of ideas, slight, guided psychic deficiencies etc. in children were better studied and many adults, he says might escape insanity later. Umbilical hernia in the adult is the result of umbilical hernia in the child, which, although possibly healing spontaneously, leaves a predisposition for later recurrence. The same might be said of inguinal hernia. The daily bath for infants may induce icterus later in the predisposed if the temperature and other conditions are not carefully regulated. As the child grows, attention should be paid to its harmonious development, whether the great cavities of the body are developing proportionately to its size, etc. The physician watching over the development of a child, Batta states, can guide it to the harmonious proportion between its various organs and parts, which is the best safeguard against disease. Preventive medicine has to be based on accurate observation to be effectual. Its field is particularly encouraging in children as they are in the formative period, but it requires a constantly vigilant eye and a skillful hand. The physician, becoming counselor in hygiene for the family, can educate the parents to direct the steps of their children into the ways of health.

Adherent Pericarditis in Children.—H. Rlesch and A. Schossberger (Zeitzschrift f. klin. Med. lix. No. 1). After an exhaustive study of the relics of adhesive pericarditis in children, and a series of experiments on dogs to investigate the causes of the symptoms observed, these authors find that adhesions of the visceral and parietal pericardium always induces isolated ascites in dogs. This shows, they think, that the adhesion in itself produces a pure portal stasis of cardiac origin, and harmonizes with what is observed in the clinic. As the result of their research they announce that this most frequent form of adhesion of the pericardium in children is characterized by a special symptom-complex. The most striking symptom is the excessive, isolated ascites; the face is slightly edematous, giving it a doughy look, pale, with cyanosis of the lips and ears and enlargement of the liver. Except for the small waved, rather rapid pulse, none of the symptoms observed points to the heart. On account of the constancy of the above symptoms, this form of adherent pericardium presents an easily recognized clinical picture. The cyanosis does not subside after tapping. The postmortem findings in 4 cases are described. In 4 others an operation was performed, a herniotomy or the Talma operation. Articular rheumatism was known in the history of 2 of the patients, and the other spoke of an affection of the lungs or pleurisy in the past, which probably was the unrecognized pericarditis causing the adhesions. Contrary to the general assumption the ascites preceded edema in the extremities. Adhesive pericarditis does not cause always the above clinical picture, but when the latter is observed an adherent pericardium can be safely diagnosed.

Further Results of Serum Treatment in Scarlet Fever.—B. Schick (Deutsche med, Woch., 1905, p. 2092). The writer points out that since Moser introduced his streptococcic serum for the treatment of scarlet fever three years ago, different verdicts have been pronounced upon its effects by various observers, though the majority seem to have been in favor of its specific influence. He endeavors to show that a portion at least of the failures have been due to the use of serums of a low value. He further records the results in another 60 cases, of which 8 were of moderate severity, 42 severe and, as regards fatality, of doubtful prognosis, whilst 10 were very severe with a lethal prognosis. Of these cases the 8 of moderate severity all recovered, and in addition only 8 of the 42 moderately severe cases and 3 of the 10 very severe cases terminated fatally. More important still was the fact that no child was lost in whom the injection took place during the first two days of illness. The effect of the serum is still marked on the third day, but on the fourth the curve of mortality rises rapidly. The serum was used in doses of 150—200 c.c. (in two instances even 400 c.c. were given), and the writer states that the suprisingly favorable influence on the mental and general condition, the disappearance of cyanosis and collapse, the rapid diminution in the color of the exanthem, the frequent fall in the pulse and temperature, and the cessation of the loose, green offensive stools cause one to become a convinced supporter of the value of Moser's serum. The beneficial effects appear about 4—6 hours after injections, a further proof being added in the absence of severe throat symptoms after early injection.

Convulsions Caused by Ascarides.—O. MAGI (Gazetta degli Ospedali, Feb. 1, 1906). A girl, aged 6, while apparently in good health, was seized with convulsions. She became very pale, but did not lose consciousness. There were sharp clonic contractions of the right facial muscles and of the right arm and forearm and slight mydriasis. There was no fever. The convulsions lasted about half an hour, but slight paresis remained. She complained of itching in the nostrils. She was treated with santonin and calomel. On the following day a similar attack occurred; but after evacuation of 5 ascarides the fits did not recur. The paresis of the face and arm disappeared in 5 days.

Inward Convulsions.—JAMES MCILRAITH (The Med. Chronicle, November, 1906). The account generally given of these attacks is that the child goes quite still and somewhat stiff, becomes pale about the face and lips, turns its eyes up, and appears to be unconscious. Sometimes the thumbs are clenched in the palms of the hands. The whole attack usually lasts about a minute, and is not accompanied by clonic convulsions, except, perhaps, some twitching of the eyelids and face muscles. It has been suggested that some of these cases are syncopal attacks due to colic, while others are analogous to the *petit mal* of epilepsy. Others consider that these attacks are the result of pressure of a gaseous distension of the stomach upon the heart. Still lays great stress upon all such manifestations of the convulsive habit, holding that they are as truly convulsive as the major attacks, and that at any moment they may run into general convulsions. The author points out that there is in these conditions a common basis of abnormal nervous instability, which may be congenital or acquired. Certainly in some cases where the child has suffered from convulsions, and in cases observed by the writer himself, the mother gave a history of previous attacks of inward convulsions, and in some of these cases a history of neuropathic taint was given. On the other hand, many children are said to suffer from inward convulsions who have never had an attack of general convulsions, and who have no hereditary history. This condition of inward convulsions is usually associated with gastrointestinal disturbances. Possibly those cases associated with clenching of the thumb in the palm of the hand may be minor convulsive attacks. McIlraith, however, does not think that the majority of inward convulsions are truly convulsive attacks.

The Wet-Nursing of Foundlings.—W. T. Watson, Baltimore (Journal A. M. A., December 8). This is a strong protest against the practice of the Board of Supervisors of City Charities of Baltimore of giving out foundling infants to be wet-nursed. The author relates the case of a respectable family which was infected with syphilis as a result of this practice, and states his belief that more cases of this kind occur than are recorded in cities and communities where this practice is in vogue. He says: "Wherever this system of wet-nursing is in vogue there chancres of the breast abound. Some years ago Bulkley collected 1,148 cases of chancre of the breast. He says regarding them: 'Italy takes the lead, furnishing 33 per cent. of the cases. Russia, Poland and France also give large numbers, in all of which countries baby farming is very prevalent.'" If the victims of this system were warned of their danger it would be impossible to continue the practice, which is a cruel deceit and one that ought not to be permitted in a country like ours. The sentimental plea that it is necessary to save the infants' lives is not justified in view of the modern methods of raising infants and their success.

Pylorospasm in Infants.—Huebner (Die Therapie der Gegenwart, October, 1906). The diagnosis of this condition depends on the presence of the following signs: Peristaltic movements of the fundus of the stomach, usually from left to right; vomiting of whole or part of the food taken, no matter what treatment is adopted; the costiveness, the stools showing the empty condition of the bowel. Vomiting associated with diarrhœa ought, in ordinary cases, at all events, to exclude the diagnosis of pylorospasm. Atrophy, moreover, should only suggest this condition when the other symptoms already mentioned are present. In thirty cases, vomiting began at birth in five; at the age of one week, in two; at the age of two weeks, in five; at the age of three weeks, in twelve. The vomiting did not start until the infant was a month old in four cases, while this symptom did not occur until the fifth and seventh weeks in one case each respectively. In eleven of his cases Heubner was unable to obtain any information on this point. Out of his forty-one cases, thirty-one were males and eight females; in two the sex was not noted. In thirty-three of his cases, eleven were breast-fed and fourteen were wet-nursed; only three were artificially fed, and in five cases various forms of nourishment had been tried—namely, the breast, peptonized milk, malt soups, and raw milk.

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SOME PHASES OF NERVOUS DISEASES IN CHILDREN.*

By Frederick Tilney, M.D., Brooklyn, New York.

For the pediatrist, the value of the so-called neurological signs is doubtful. Such signs may often prove misleading unless corroborated by other evidence. Syndromes, on the other hand, while they must be considered the only competent evidence upon which to base a well rounded opinion, depend upon such extensive neurological examinations as are wholly impracticable for the uses of the children's specialist. In a general way we recognize certain phases in the life of any individual so that we may speak of the various phases of consciousness, the phases of motricity or the motor organization; the phases of sensation or of the sensory system; the phases of the vegetative process or the visceral system.

The purpose of this paper is to discuss briefly certain disturbances in a few of these phases which should be of interest to the pediatrist.

Phases due to Disturbances of the Conscious State.—Delirium, stupor and coma are among the most frequently observed disturbances of consciousness met with in children. Any one of these conditions may be due to a general systemic toxemia. On the other hand each may be caused by a focal lesion within the skull. As a rule, delirium or stupor of cephalic origin is attended by other signs indicating the effects of some toxic factor, *e. g.* temperature, restlessness, and rapid hard action; oftimes convulsions. Coma, however, may and often does exist without the attendant symptoms of toxemia. Coma following head injuries is generally immediately due to concussion, contusion, epidural hemorrhage or depressed fracture. Coma following head injury after the lapse of several hours, generally indicates an epidural hemorrhage, and is not infrequently accompanied by a monoplegia. Coma sometimes follows head injuries after the lapse of several days or more, most frequently with rapidly fatal results.

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*Read before the Brooklyn Pediatric Society.

Thus, a small boy was hit on head with stone, and remained unconscious four hours. Two days later while running, the child fell unconscious and died in six hours. Post mortem revealed what appeared to be two chronologically distinct hemorrhages. The older of the two was epidural while the more recent was subdural and had invaded the basal region. Both hemorrhages apparently started from the same bleeding-point. A child previously in apparent good health may fall suddenly into deep and prolonged coma. This is occasionally the case in tuberculous meningitis of the base giving rise to hydrocephalis internus acquisituis. I am acquainted with two such cases in each of which the patient, seemingly in the best of health, fell suddenly and without warning, into prolonged coma. Examination revealed the true nature of the disease, while the previous histories developed many facts which assumed much importance in the light of the actual disease (Writer's cramp, hysteria, headaches, epistaxis, excessive body weight etc).

In cerebro-spinal meningitis if coma supervenes it is only after progressive march of other characteristic symptoms always beginning with the ominous stiff neck which persists even during coma. Young infants with syphilitic heritage may never attain the state of consciousness normal to their stage of development. Such was, under my own observation, the case of an infant, born after six consecutive miscarriages, and surviving for eight months in a state of more or less profound coma. Again syphilitic children may begin to show indefinite signs of failing health, which become progressively worse, until they pass into a comatose condition and die. As a rule, such cases are due to a syphilitic encephalitis. Coma of a distressing character often follows attacks of epilepsey but the history of previous seizures will leave no doubt as to the true nature of the condition.

PHASES DUE TO DISTURBANCES INVOLVING THE MUSCULAR STATUS.

(a) *Convulsions.*—All convulsions represent reflex phenomena, *i. e.,* sensorimotor systematizations made possible through the central nervous system. They are the translation of unnatural or excessive sensory stimuli into purposeless and excessive motor manifestations. The starting point of the unusual stimulus may be in any sensory portion of the body, or it may be central, in which case the convulsions are spoken of as being of intracranial origin. I shall confine myself to the last mentioned class.

The most common type belonging to this class of convulsions in children are those described as epileptic. Not infrequently however, it becomes necessary in young children to differentiate between epileptic and hysterical convulsions. Thus, in a case seen in the Kings County Hospital a girl eight years of age, presenting a retrogressive progression, (locomotion being possible only if she walked or ran backward,) ultimately developed hysterical convulsions. The following points serve to differentiate these two types:

In Epilepsy the face is always cyanosed.

In Hysteria the face is never cyanosed.

In Epilepsy the spasm in its initial stage is tonic.

In Hysteria the spasms are generally tonoclonic from the start.

In Epilepsy the tonic period is followed by a clonic spasm which in turn gives place to coma or profound somnolence.

In Hysteria the tono-clonic spasm is followed by general tremor which in turn gives place to violent purposive movements, kicking, biting, beating face, etc.

In Epilepsy the tongue may be bitten and the patient injured in falling.

In Hysteria the tongue is never bitten and the patient never injured in falling.

Another large class of convulsions in growing children are those which may be termed (rather loosely) pseudo-epileptic. Very frequently a child is seen who is said to have as many as twenty or thirty fits a day. These fits are often described by the parent as epileptic. Thus, a boy nine years old was brought to the Polhemus Clinic with the story that he was in the habit of having fifteen or twenty fits a day and was steadily getting worse. This patient was treated mainly with reference to his gastro-intestinal system according to Holt's method and with small doses of bromides. After two weeks the convulsions disappeared and during the past eighteen months the boy has had but four attacks. Oftentimes these cases do well on thyroid extract. The great frequency of the seizures serves to differentiate them from the epileptic type.

Convulsions of intra-cranial type may arise from a number of causes producing demonstrable organic lesions of the brain. The most frequent of these causes is polio-encephalitis superior, as a result, definite areas of one or both hemispheres become involved by a destructive inflammatory process. Commencing with a febrile movement and vomiting, the convulsions soon set in. They are not relieved by the ordinary measures and may continue unabated for several hours. Their true nature shortly becomes manifest for the child presents the signs of paralysis which is at first flaccid but rapidly assumes the spastic type. Should the area of involvement lie near the vertex in the motor area both hemispheres are likely to be affected and the resulting impairment is a spastic paraplegia. The greater number of cases, however, present a spastic hemiplegia with much deformity of the affected extremities. Nor with the establishment of the spastic paresis are the convulsions at an end, for they may be subsequently repeated with ever increasing frequency until a status epilepticus is present and the higher faculties greatly impaired. Thus, a case of infantile spastic hemiplegia which I have had opportunity to follow closely for the last two years has, during all that time, steadily increased in its tendency toward epileptiform seizures; these attacks now occurring four times as frequently as when the case was first seen.

Convulsions appearing within a few hours after birth are not infrequently due to compression of the brain by a meningeal hemorrhage. Post mortem examination show that by far the greatest number of infants dying of convulsions within the first month have hemorrhagic involvement of the brain, particularly subpial in type. Meningitis, tubercular or syphilitic, on the convexity of the brain may give rise to convulsions with or without causing actual permanent impairment of motor function.

Convulsions following the abrupt cessation of discharge from the ear should arouse grave suspicion of abscess in the temporal lobe. Even in children, tumor of the brain must not be overlooked as a cause for convultions. Indeed, this etilogical factor should be most diligently searched for in every suspicious case, nor should any time be lost in arriving at a conclusion since this condition is at the present time, offering fair opportunity for surgical interference. Thus, in the case of a thirteen year old girl seen last summer with Dr. Ager in the Polhemus Clinic, the patient complained of progressive loss of vision, severe diffuse headache and frequent convulsive seizures. The retina was said to present a picture very similar to albuminuric retinitis, although the urine was normal. In six weeks the patient became totally blind and the convulsive attacks increased in severity and frequency. Diagnosis of tumor in the cuneate lobe was made, but before the case could be carried further, the girl died after convulsions which lasted for five hours. Post mortem revealed a tumor in the right occipital and cuneate lobes, attached to which was a sac invading the right lateral ventricle and containing eight ounces of fluid.

(b) *Spasms and irregular involuntary movements.*—The movements of Chorea, Athetosis, Habit spasm and Tic declare their true nature and are easily diagnosed. An interesting condition is children is Unverricht's. Family myoclonus or myoclonus epilepticus, characterized by paroxysms of sudden shock-like contractions of the muscles which last for several minutes. In addition to the spasms the patient suffers also from epilepsy. Generally several members of the same family and generation are affected. This condition is comparatively rare, but the pediatrist has perhaps widest opportunity for the detection and recording of such cases and may thereby make valuable contributions to the present knowledge of the disorder.

Still another interesting condition in young children is tetany, a spasmodic and but little understood condition. Here the child either in sleep or while awake is subject to painful tonic contractions of the myotomic musculature, especially involving the hands and feet. The fingers are flexed at the metacarpal-phalangeal joint but extended at the phalangeal joints and so pressed against the extended thumb which takes the opponens position. In this manner the hands assume a conical shape as a result of the spasm. The toes are plantar flexed, the feet dorsi-flexed and everted. Pressure on the nerve trunks of the affected limbs will produce the typical spasms. This is called Trousseau's Sign. Light percussion over the parotid gland will cause a hemifacial spasm, due to excessive irritability of the facial nerve. This is known as Chvostek's Sign. Such a case was recently seen with Dr. Woglom in the children's Department, Polhemus Clinic. This disorder is transitory, never lasting more than five or six weeks and is seen most frequently in rickety children. It is of quite frequent occurrence in Germany and Italy, and generally, when seen here, is found in children of German or Italian parentage.

The Reflexes.—Without discussing in detail the theories or philosophy of the reflexes it may be stated in the general case that the condition of the reflexes should convey to the observer's mind two distinct impressions:

First. Whether or not the circuit between certain sensory areas and certain corresponding muscular structures is intact. This arc or circuit may be interrupted in its afferent or sensory path, in its efferent or motor path, or in one or more of its receiving centres situated in the spinal cord. Thus, if the arc is impaired in any of its parts the reflex is lost or diminished.

Second. The reflex phenomena indicate the quantity and quality of control exerted upon the spinal reflex arc by the higher centres in the brain. Thus, if the connection between the brain and the spinal reflex arc were interrupted, the reflex phenomena would become exaggerated in proportion to the degree of this interruption.

Clinically we recognize three varieties of reflexes:

1. Superficial—Skin to skeletal muscle reflex.
2. Deep—Tendon to skeletal muscle reflex.
3. Organic or Visceral—Visceral sensory area to non-skeletal muscle.

The Superficial and Deep Reflexes depend upon the spinal cord for their performance. The Organic Reflexes depend upon the Sympathetic for their performance. Of all the superficial reflexes the one of the greatest practical value is the so-called plantar reflex. This is elicited by stroking the sole of the foot from heel toward the toe near the inner side. To get the best results, the foot should be warm, the thigh flexed upon the hip and externally rotated while the leg is flexed upon thigh. Under normal conditions the great toe will be plantar flexed, the lesser toes flexed also while the sole of the foot is concaved under the contraction of the intrinsic plantar muscles. In addition to this the leg tends to become more flexed on the thigh and the thigh flexes on the pelvis. The normal conditions upon which this reflex depends are two in number:

First. The integrity of the reflex arc.

Second. The intact and myelinized condition of the pyramidal tracts.

It will be observed that while the sensory area which receives the stimulus, is limited to a small strip on the sole of the foot, the muscles called into action thereby are not limited to a single group but include all the flexor muscles of the lower extremity. We are not altogether justified, however, in saying that this reflex represents a communication between the skin on the plantar surface and the flexor muscles, for there are good reasons to believe that both flexors and extensors are called into play by the reflex. But what we may say is that the flexor phenomena observed, are here as elsewhere in the body, due to the preponderant strength of the flexor muscles. But now let the leg become spastic and rigid. Here also the flexors hold the upper hand; the foot presents a typical spastic toe drop of peroneal type (supination). Because of this rigid toe drop the flexors of the foot and toes, especially the great toe, are put at decided mechanical disadvantage. One may determine this, in part, by putting the foot in extreme plantar flexion and observing how almost impossible it is to flex the great toe. It must not be forgotten that in a *purely* spastic condition of the leg the extensors of the foot and toes are also under spastic tension, and that this increase of tension is further augmented by the simple mechanical traction of the spastic toe drop. Now, stimulate the sole and what happens? The flexors of the foot and toes are already at a mechanical disadvantage while the extensors of the foot and toes are placed at a twofold mechanical advantage. The balance of power is therefore thrown to the extensors and an extensor phenomenon results, giving dorsal flexion or extension of the great toe. This is known as Babinski's reflex or phenomenon and always indicates an undeveloped or pathological condition. Babinski's sign means a pure spastic condition of the lower extremity. Physiologically this condition means that the higher centres in the brain are not exerting their normal inhibitory influence over the reflex arc governing the leg. Anatomically this means that the pyramidal tract is undeveloped or pathologically interrupted. In young infants before the time for walking the pyramids are unmyelinized and hence undeveloped so that prior to this period the Babinski phenomenon is the rule. Subsequently, however, the presence of Babinski's sign is always a most reliable indication of a pathological condition somewhere in the course of the pyramidal tracts. Polioencephalitis superior is the most prolific cause of Babinski's phenomenon and the sign is always present in infantile spastic paralysis. Sometimes lepto-meningitis may involve the cord in which case the pyramid would be involved and the sign produced. Babinski's sign is the one sure test to differentiate between functional and organic spastic paralysis. Gordon has described a different method for eliciting the flexo-extension balance in the foot. By deep pressure on the calf muscles (probably stimulating the posterior tibial nerve) extension of the great toe may be brought out when Babinski's method fails. This is called the parodoxical flexor reflex, or reflex parodoxus. In itself, this is a bad piece of nomenclature since the reflex is not paradoxical but representative of exact cause and effect. Oppenheim employs a method of developing dorsi-flexion of the toe, in which by stroking deeply with the handle of a percussion hammer along the postero-internal border of the tibia the phenomenon is well brought out. This is called Oppenheim's reflex and has the same general significance as Gordon's and Babinski's signs. The bulbo-cavernosus reflex is of importance in determining the condition of the conus terminalis (inferior end of cord) and the cauda equinæ. In the conus are situated the centres of micturition, ejaculation and defection (latter in part) and the question often arises in cases of enuresis or incontinenta elvi, whether or not the reflex arc is intact. Thus, in a twelve year old boy who gave the history of distressing enuresis, the bulbo-cavernosus reflex was found to be greatly diminished. The symptoms dated back to an attack of scarlet fever, which disease not infrequently causes congestion of the conus with consequent enuresis. The trouble had persisted for seven years but was cured in three months by faradism directed at the sphincter urethræ.

The reflex is determined by placing one finger behind the scrotum and against the bulbous urethræ while the glans penis is compressed between the thumb and forefinger. As a result, under normal conditions, the sphincter urethræ is felt to contract forcibly.

All of the more commonly employed deep reflexes with one exception, depend upon the integrity of reflex arcs in the spinal cord. The one exception, the jaw-jerk, represents an arc completed in the pons.

The deep reflexes are lost most frequently in children after the acute stage of acute anterior poliomyelitis. Here the arc is interrupted at its centre in the cord. Sensation is not disturbed, but the trophic and vaso-motor innervation of the part affected is greatly deranged. Among the most prominent symptoms are, rapid atrophy, the reaction of degeneration together with the very perceptible difference in temperature between the sound and affected parts.

Neuritis as a cause of diminished or lost reflexes is a rare occurrence except in traumatic delivery neuritis of the circumflex nerve. This is a none too infrequent occurrence. As a result the scalpo-humeral reflex is lost, the humerus internally rotated under the unopposed action of the sub-scapular is, together with paralysis deltoid.

In any form of myopathy the deep reflexes are lost, as they are also immediately after attacks of major epilepsy. Peculiar significance attaches to the fact that the deep reflexes are lost during pneumonia and diminished in severe cases of influenza; the predilection of the pneumonococus is hereby somewhat demonstrated. In this connection it is of interest to observe rabbits injected with pneumococus cultures may die in twenty-four hours of total paralysis without any pneumonic symptoms. The deep reflexes are temporarily exaggerated in the acute stages of all infectious diseases, and permanently exaggerated in hysteria, tetanus and strychnine poisoning as well as any lesion which interrupts the pyramidal tracts.

Gaits and Postures.—After a careful study of the muscular mechanics involved in the biped posture and gait it is possible to detect very readily the pathological factor or factors in a defective locomotion. In anterior poliomyelitis the most prevalent kind of paralysis is the so-called peroneal type. Here the patient presents a well-marked toe-drop and walks with the affected foot turned far out and the limb held stiff at the knee. During each phase of full weight upon the paralyzed leg the body is rotated toward that side. The posture in standing is also characteristic, for out of fifty cases of the peroneal type I have never seen one in which the genu recurvaturum was not more or less well marked, due to partial paralysis of the hamstring muscles. The characteristic posture and gait of infantile spastic hemiplegia needs no description. The same is true of the scissor progression of infantile spastic paraplegia. In both of these cases the nature of the organic lesion always determines, almost with mathematical precision, the character of the defective posture and gait, giving the flexors and adductors the balance of power.

In young boys and girls it is often necessary to decide whether an impairment of gait or posture is organic or hysterical. Thus, a boy eight years old was brought to the clinic with a tentative diagnosis of bilateral luxation of the hip. He had a rocking, waddling gait and gave a history of frequent falls. Four treatments of somewhat unusually heavy galvanism and vigorous massage exercised the luxations. Again, a girl twelve years old complained of being paralyzed in both legs. She managed to walk very slowly with a shuffling gait, legs abducted, toes turned in and scraping. The mother said that this trouble began as paralysis first of one arm, then of both, finally leaving the arms to invade one leg and subsequently both. The following particulars will serve to differentiate between organic and functional spastic paralysis in the legs.

1. The spastic posture is always logical in organic lesions. In hysterical conditions it is never logical but, so to speak, grotesque. Hysterical contractures are not governed by the usual anatomical rules.

2. By the side-gait test of Schüller (in which patient is made to walk sidewise) in organic lesions progression toward the defective side is good, while toward the sound side it is greatly impaired. In hysterical conditions it is equally bad or grotesque in either direction.

3. By Heilbronner's sign in organic lesions, a distinct broadening of the thigh is recognized. This is only apparent and due

to external rotation of the thigh with adduction. This sign is never present in hysterical conditions.

4. And finally in cases whose histories fail to disclose a definite clew, great reliance may be set in the Babinski phenomenon for in organic spastic paralysis it is always present, while in hysteria it is as constantly absent.

INFANTILE SCURVY.*

By George F. Still, M.A., M.D., Cantab., F.R.C.P. Lond.

Infantile scurvy is often spoken of as if it were a disease of recent discovery and of modern development Its recognition all over the scientific world is justly associated with the names of Dr. Cheadle and Sir Thomas Barlow, to whose investigations is due almost all that is known of the pathology of the disease. But to suppose that infantile scurvy was unknown, or even that its true nature as a scorbutic condition complicating rickets was unrecognized until the nineteenth century is an error, and one that has crept into many textbooks.

As long ago as the middle of the seventeenth century, Glisson, in his *Treatise on the Rickets,* had not only described the characteristic symptoms of infantile scurvy, but, with more accuracy than some of his successors, had recognized that it was scurvy complicated with the rickets and not an acute form of rickets. In the English translation, published in 1651 (p.249), he says: "The Scurvy complicated with this affect (rickets) hath these signs: (1) They that labor under this affect do impatiently endure Purgations; but they who are only affected with the Rachites do easily tolerate the same. (2) They are much offended with violent exercises, neither can they at all endure them. But although in this affect (rickets) alone there be a kind of slothfulness and aversation from exercise, yet exercise doth not so manifestly, at least not altogether so manifestly, hurt them as when the Scurvy is conjoined with the rachites. (3) Upon any concitated and vehement motion they draw not breath without much difficulty, they are vexed with divers pains running through their Joynts, and these they give warning of by their crying. . . . (4) Tumors do very commonly appear in the Gums. (5) The urin upon the absence of the accustomed fever is much more intense and increased."

Glisson (*ibid.,* p. 227) actually emphasizes what is not yet sufficiently recognized, that there is no essential connection between infantile scurvy and rickets; he says "the scurvy is sometimes conjoined with this affect," and after mentioning as causes heredity, infection, and the possibility that it may be "produced from the indiscreet and eroneous regiment of the infant," though he attributed it chiefly to climatic influences, he adds, "for it (scurvy) scarce holdeth any greater commerce with this disease (rickets) than with other diseases of longer continuance."

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*Brit. Med. Jl.

Such terms as "scurvy rickets," "acute rickets," and "hæmorrhagic rickets"—names which would imply that scurvy is a variety of rickets—have been responsible for much confusion. Obscure though the exact etiology of infantile scurvy may be, it is clear from clinical facts that this affection arises from causes entirely distinct from those which produce rickets; severity of rickets raises no special probability of scurvy; indeed, the worst cases of scurvy are often associated with very slight rickets, and in some cases with none. Both diseases are due to faults of diet, and it is likely enough that a diet which is faulty in one respect may be faulty in another; the particular fault which produces rickets may be, and no doubt often is, present when the diet shows also the particular fault which produces scurvy. But the fault is not one and the same; witness the many infants who suffer with severe rickets after being fed from an early age with potato, which would seem when given at that age to favor if not actually to cause the occurrence of rickets, whereas there is probably no more powerful agent than potato in the prevention or cure of infantile scurvy.

The clinical picture of the fully-developed disease is striikng enough; an infant who has been fed upon one of the patent foods, with or without milk, or on milk which has been condensed, sterilized, or otherwise altered, has been ailing for some weeks, has taken food badly, and probably lost weight. Moreover the mother says it cries whenever it is touched, and, as she puts it, "has lost the use of its limbs." The infant is pale, it lies quiet perhaps until it is approached, when it cries out in obvious dread of being touched; the legs lie motionless, usually with the thighs slightly abducted and everted and the knees slightly flexed; the arms are less often affected. There may be some swelling of part of one or other of the limbs, obliterating the natural curves. Any handling of the affected limbs causes a piteous cry, evidently of acute pain. If teeth are present the gums around them are swollen and purple, occasionally projecting like a mass of granulations, almost completely hiding the teeth, and bleeding readily when touched. The urine is perhaps smoky, if not red with blood.

Such in outline is the characteristic picture of infantile scurvy, which I shall now consider in more detail, chiefly with reference to diagnosis and treatment.

AGE-INCIDENCE.

The age at which infantile scurvy begins is a point of considerable importance in diagnosis. My own observation shows that in 54 cases its onset was almost limited to the later half of the first year of life, and in three-fourths of the cases the disease begins between the age of 6 months and 10 months.

So marked is this special age-incidence, that given an infant of 6 to 12 months and a history of tenderness in the limbs, the diagnosis of scurvy should at once suggest itself as a possibility. In several of the cases in this series the disease had been diagnosed as "rheumatism"—a mistake which ought never to occur, for rheumatism is practically an unknown disease under the age of 18 months, and indeed is exceedingly rare under the age of 3 years. In no case did scurvy begin before the age of 5 months—a point which distinguishes this disease from many cases of syphilitic epiphysitis which begins most often under the age of 3 months.

MODE OF ONSET.

So much stress has been laid upon the affection of the gums and upon the tender swellings in the limbs in infantile scurvy that there is danger of forgetting that in many cases there are other more insidious symptoms which may appear some weeks before these obvious manifestations. An infant who has thriven hitherto upon some patent food begins to ail, the weight ceases to rise or actually falls, the feeds are taken badly, and the child is fretful and miserable; there is no swelling of limbs, perhaps no definite tenderness anywhere, and the gums are perfectly normal; but that these early symptoms indicate scurvy may be shown not only by the rapid improvement within two or three days on antiscorbutic treatment, but also in some cases by the presence of blood in the urine even in this early stage.

I doubt whether the onset of scurvy is ever really sudden, but undoubtedly the more pronounced symptoms may appear quite suddenly, and are then apt to be mistaken for the results of traumatism; for example, an infant, aged 8 months, was brought to me because he was "not getting on;" there had been some tenderness in the legs for at last four weeks, but the nature of this had not been recognized; one morning the child had his usual bath and then went to sleep for a short time: he awoke with the left eye partly closed by great swelling of the lids, which were discolored and soon looked as if bruised; it was concluded that during the bathing the child must have struck his eye against the side of the bath. The history, however, of feeding with Allenbury and Benger's foods, the tenderness of the legs, and the presence, as examination showed, of blood in the urine, all pointed to scorbutic hæmorrhage, and the rapid disappearance of the swelling and hæmorrhage from the lids under antiscorbutic diet confirmed the diagnosis.

It would, I think, be rash to assert that the supposition of traumatism is wrong in all such cases. The hæmorrhagic tendency of scurvy may well favor the occurrence of hæmorrhage from slight traumatism, which would have no such effect in a healthy infant, and this view is supported by the situation of superficial hæmorrhages; for example, in one case the only subcutaneous hæmorrhage was over the bony prominence of the sacrum, a part obviously exposed to pressure and jarring; in another which was sent to me as a case of infantile paralysis the efforts of the doctor to obtain a knee-jerk had resulted in a subcutaneous hæmorrhage over the patella.

LIMB AFFECTIONS.

Perhaps the most striking feature of infantile scurvy is the tenderness of the limbs and loss of movement. These symptoms occur much more often in the lower limbs than in the upper. In the 54 cases tenderness or swelling was present as follows: In 39 in the legs only, in 10 in legs and arms, in 1 in the arm only. In 4 out of the 54 cases there was no tenderness in any of the limbs. The diagnosis in these cases rested on the association of a scorbutic diet with hæmaturia, confirmed in two where teeth were present by affection of the gums, and in all by the rapid cessation of hæmaturia on antiscorbutic diet.

With the tenderness there is sometimes associated some visible or palpable swelling of the affected limb, but in many cases this is so slight that it is easily overlooked; and as it is the result chiefly of subperiosteal hæmorrhage it may be detected only by careful—and, I would add, most gentle—palpation of the bone as a vague, deep thickening. The situation of this thickening is of some importance; it is not limited to the epiphysial region like an epiphysitis, but extends some distance along the shaft of the bone—a point which should distinguish it also from any joint affection. In my own cases the swelling has been most often about the lower third of the tibia or the femur but any part or the whole, of the shaft may be surrounded by subperiosteal hæmorrhage, and occasionally, though much more rarely, similar deep hæmorrhage may occur over the flat bones of the skull, producing large bluish swellings on the head which may simulate sarcoma, or over the scapula, as in a specimen in the museum of this hospital.

The loss of movement in the affected limbs is so marked that the disease had been mistaken more than once in my series for infantile paralysis—a mistake which hardly ought to occur, for the acute tenderness, the severe pain on passive movement, the swelling and local thickening, and the associated conditions of the gums and urine are all features quite foreign to infantile paralysis. The loss of movement is no doubt due partly to fear of the acute pain which movement causes; but it may also be due partly to mechanical disability, for not only is the periosteum stripped off the bone by the underlying hæmorrhage, but, as I have seen in some autopsies on infantile scurvy, the muscles also in severe cases are infiltrated with serum and extravasated blood. Occasionally there is further disablement from separation of epiphyses by extensive hæmorrhage at the epiphysial line; in one case which I examined epiphyses had been separated in all four limbs. This danger of separation of epiphyses, which is due to effusion of blood at the epiphysial junction, is a point to be remembered in the handling of these infants with scurvy. Cases have been recorded also in which fracture occured in the shaft of the bone.

OEDEMA.

The occasional occurrence of œdema over the thickened part of the limbs in scurvy is worthy of notice. In the diagnosis between scurvy and suppurative periostitis it might have been thought that œdema pointed to the presence of pus. This is certainly not so; I have seen well-marked pitting of the skin on gentle pressure in cases of infantile scurvy.

GUMS.

The characteristic appearance of the gums has already been mentioned, but it is to be remembered that any great swelling or discoloration of the gums is by no means a constant feature; often it requires careful observation to detect the little affection that exists. There may be only a thin purple line or minute patch of red discoloration at the free edge of the gum; and I have specially noted that in some cases it was only on the posterior edge of the gum behind the tooth, and therefore very easily overlooked.

It is generally stated that where there are no teeth there is no gum affection; this is not strictly accurate, for where the teeth are close up to the surface of the gum but not actually through I have seen hæmorrhage in the gum over them. When teeth are present the gums are not necessarily affected; in 7 out of 39 cases in which teeth were present in my series the gums showed nothing abnormal.

Very rarely the gums are markedly affected when there is no other obvious symptom of scurvy. In one of my cases there was no tenderness whatever in the limbs, although the gums showed very marked swelling and purple discoloration. In another some tenderness had been noticed in the legs, but had passed off when I saw the child, whose gums were swollen and purple. In both these cases the existence of scurvy, suggested by the diet and the gums, was proved by the finding of blood in the urine.

PALATAL HAEMORRHAGE.

I wish to call attention here particularly to a manifestation of scurvy which has not, I think, attracted much notice, namely, hæmorrhage in the mucous membrane of the hard palate. The discoloration occupies the middle part of the vault of the hard palate; it has not in my cases extended forward to the alveolar portion, nor backward to the soft palate. The color varies from a bright blood red to a deep almost black purple. As in the gums, the affected area may become secondarily inflamed and the mucous membrane over it roughened. Such were the appearances in 4 of my cases, but as I had not looked for this manifestation in the earlier cases I cannot tell in what proportion it is to be found. This palatal hæmorrhage is certainly noteworthy, as it may assist diagnosis when it occurs—as in 3 out of my 4 cases—in infants who, owing to absence of teeth, show no gum affection.

ORBITAL HAEMORRHAGE.

"Black-eye" in an infant 6 to 12 months old, without obvious traumatism, should suggest the possibility of scurvy; but it is not a very frequent symptom. It was present in 6 out of the 54 cases, and in 5 of these was sufficient to cause proptosis of the eye. Curiously enough, in all 6 it was the left eye that was affected. The discoloration appears usually chiefly or only in the upper lid.

URINARY SYMPTOMS.

The diagnostic importance of the urine in infantile scurvy is not sufficiently appreciated. Urinary changes are actually more constant than the gum affection, and an examination of the urine will usually clinch the diagnosis if there be any doubt. During the last few years I have examined the urine of all cases under my notice as far as possible, and out of 34 cases only 4 showed nothing abnormal. In 11 there was blood only, in 8 blood and casts, in 2 blood and pus, in 1 pus only, and in 7 albumen only; so that the proportion of cases showing some urinary change was 88 per cent., and the proportion showing hæmaturia was 60 per cent.

But it must not be supposed that blood is to be detected by the naked-eye appearance of the urine in this proportion of cases. In many the amount of blood was so small that it was seen only by careful microscopic examination; and when pus was present, although sufficient to attract attention at once under the microscope, it was not sufficient in any of my cases to be detected by the naked-eye, although in one there was enough to make the urine slightly turbid.

It is generally stated that hæmaturia may be the only symptom of infantile scurvy; and if the hæmorrhagic manifestations are to be taken as the only evidence of scurvy, this is certainly so. In 2 of the cases mentioned above, there was no affection of the limbs or gums—in fact, no characteristic symptom except hæmaturia; but in both there had been wasting recently, and one was fretful and miserable, and the other would not take his food; there were in fact—as I suspect there usually are in these cases where hæmaturia is stated to be the only symptom of scurvy—

these vague symptoms of disturbed nutrition which I have described as marking the onset of scurvy. The presence of casts in the urine in association with the blood may indicate a nephritis in some cases. As I have pointed out,[1] the casts are sometimes numerous, and easily found without centrifuging, and the albuminuria occasionally persists for many weeks or months. The occurrence of pyuria with acid or neutral urine, and without any special evidence of irritability of the bladder, would seem to point to a pyelitis. and this was the clinical condition in three of my cases. The recognition of this pyuria is of some practical importance for, like the nephritis, it is aut to persist after all the acute symptoms of scurvy have passed away. In one case where the tenderness and loss of movement in the legs had begun to improve within forty-eight hours, and were as usual cured in a few days by antiscorbutic diet, the pyuria persisted nearly five weeks, and during this time the child remained pale, and failed to gain weight until the pyelitis began to subside. Not only may the pyelitis retard the infant's recovery, but it seems likely that this condition, which when it occurs as a primary affection in infants causes severe pyrexia, may account in some cases for the high temperature which sometimes accompanies infantile scurvy. In the case in which the urine showed pus without blood the temperature was 104.4°; and in one of the cases in which the pus was associated with blood, a slighter degree of pyrexia persisted for nine days after antiscorbutic treatment began although the gum symptoms and tenderness of limbs had rapidly subsided; the pyuria in this case lasted twelve days.

TEMPERATURE.

Pyrexia in infantile scurvy, although rather the exception than the rule, is by no means a rarity; the temperature may be raised to 101° to 102° F. when the infant comes under treatment, but it subsides generally within a few days as the acute symptoms of scurvy disappear. In some cases, however, the temperature rises to 103° to 105° F., and as I have pointed out, this may depend upon the presence of pyelitis. The occurrence of fever in infantile scurvy is worth remembering, for this symptom, like the œdema to which I have referred, has been regarded as pointing to suppurative periostitis—a very serious mistake if it leads to incision, a measure which would only increase the risks of infantile scurvy.

If the possibility of scurvy is borne in mind, and the history of feeding, the gums and the urine are investigated, this error is not likely to arise.

OTHER HAEMORRHAGES.

Skin.—Hæmorrhage into the skin is quite the exception in infantile scurvy; it was present in 6 out of the 54 cases, excluding those in which orbital hæmorrhage showed as "black-eye"; in two cases it showed as a linear bruise running downwards and outwards for nearly an inch from just below the inner canthus; in one the situation was the scar of vaccination.

Mucous Membranes.—I have already mentioned hæmorrhage in the mucosa of the hard palate. The visceral mucous membranes may be similarly affected; in a specimen figured in the museum of the Children's Hospital, Great Ormond St., hæemorrhage has occured into the mucous membrane of the bladder. Bleeding from mucous membranes is not very common; in three of my cases slight epistaxis had occured, and in one of these there was bleeding, also from one ear. Less rare is the passage of streaks of blood with the stools (noted in 8 cases).

VISCERAL HAEMORRHAGE.

Post-mortem examination showed in one of my cases that extensive hæmorrhage may occur in connection with viscera, though such an occurrance is probably rare. A boy aged 13 months, who had been fed on Savory and Moor's food mixed with condensed milk since the age of 4 months, had much swelling and tenderness in the left thigh and leg, and purple swelling of the gums. He was admitted under my care at King's College Hospital, and at once put upon antiscorbutic diet, but developed diarrhœa and died within a few days. Autopsy showed, in addition to the subperiosteal hæmorrhage in the leg, that there were strands of old adhesions over the right lung, and in the meshes thus formed there was a layer of fresh blood clot about one-eighth of an inch thick over a large portion of the lung. Another case in which visceral hæmorrhage raised an important practical point was one seen in consultation with Dr. H. J. Spon. The child, aged 8 months, had been fed on the Allenbury foods, and had tender swelling about the lower third of the right femur, and some scorbutic affection of the gums; the infant was extremely ill, and was passing blood and mucus frequently from the bowel; it had vomited twice on the day when I saw it. The abdomen was flaccid and hollow, but in the direction of the transverse colon it showed an elongated sausage-like tumor which on palpation was firm, and seemed to vary in hardness at intervals during palpation. Had there been no scurvy I think no one would have doubted that there was an intussusception. The child continued to vomit, but the bowels were open, and after consultation with my surgical colleague, Mr. F. J. Steward, and an unsucessful attempt to reduce the tumor by injecting fluid into the bowel, it was decided to postpone operation, as the possibility of the tumor being hæmorrhagic was in our minds; moreover, the child's general condition seemed almost desperate. Under antiscorbutic treatment the child improved, and I heard subsequently from Dr. Spon that the abdominal tumors became less, and gradually disappeared after several weeks. I suppose there can be no doubt that in this case there was a mass of blood clot surrounding the bowel, perhaps in the wall of the bowel.

JOINTS.

As already mentioned, infantile scurvy is sometimes mistaken for some joint affection; careful examination, however, shows that the tenderness and swelling is not connected with the joints, but with the shaft of the bone. Whilst however, I know of no clinical evidence that arthrites ever forms part of infantile scurvy, hæmorrhage into joints certainly may occur; in one of my cases there was found at autopsy a fresh blood clot about the size of a shilling, lying free in the intercondylar part of the knee-joint. In a drawing preserved at the Children's Hospital, Great Ormond St., a hæmorrhage is shown under the synovial membrane of the acetabulum in a case of infantile scurvy.

PROGNOSIS.

There are few diseases in which the effect of treatment is so striking as in infantile scurvy; under *efficient* antiscorbutic diet the tenderness and pain on movement is usually appreciably less in forty-eight hours, and I would lay it down as a rule that if proper antiscorbutic dieting has produced no definite improvement within four days the diagnosis of scurvy should be questioned.

But although such rapid diminution of the tenderness and pain may be expected, other symptoms persist longer; the subperiosteal hæmorrhage if large may cause some deep thickening to remain for two or three weeks. Occasionally the thickening remains for many weeks or months, in spite of the complete disappearance of all other symptoms of scurvy. This is explained by a specimen in the museum of the Children's Hospital, Great Ormond St., which shows a layer of bone deposited by the separated periosteum and forming a bony sheath enclosing the subperiosteal hæmorrhage. I am indebted to Dr. Lees for kind permission to mention this case, which was under his care.

But apart from the mere persistence of symptoms, there are other more serious risks in infantile scurvy. I have several times heard medical men make light of the danger of scurvy from patent foods on the ground that not only is scurvy an uncommon result but that when it occurs it is speedily cured by simple changes in the diet. No doubt the risks of scurvy would be minimized if the disease were detected at its earliest onset; as a matter of fact, it is hardly over recognized until the infant has already passed through weeks of needless and intense suffering. This, surely, is serious enough; but there is also a very real risk to life; in 3 out of the 54 cases the disease proved fatal by diarrhoea and exhaustion, and even when death does not result there is sometimes prolonged disturbance of nutrition so that the infant fails to gain weight and remains ill-nourished and frail for weeks or months after all other symptoms of scurvy have disappeared. The renal symptoms may influence the prognosis—in one of my cases of nephritis with scurvy the child showed a trace of albumen in the urine, and was frail in appearance two years after the occurrence of scurvy—and pyelitis may persist for several weeks and nutrition may suffer therewith. The mere presence, however, of blood in the urine does not seem to be of serious import; it usually ceases in a week or ten days under antiscorbutic treatment.

PREVENTION AND TREATMENT.

Scurvy is an entirely preventable disease, and it is important, therefore, to know the foods upon which it is liable to arise. In the subjoined table are stated the kinds of food in use for several weeks or months before the appearance of scurvy in this series of cases:

Patent foods containing dried milk, prepared according to directions, with water, only 14 cases.

Patent foods prepared with fresh milk	18 cases.
Patent foods prepared with condensed milk	11 cases.
Patent foods prepared with sterilized milk	1 case.
Patent foods prepared with fresh (unboiled) milk	1 case.
Condensed milk diluted with plain water, barley water, or lime water	5 cases.
Sterilized milk	3 cases.
Peptonized milk	1 case.
Boiled milk	1 case.

In the above table where "fresh milk" was used in mixing the food, it was usually, if not always, heated to boiling during the process.

It is clear that the mere fact that cow's milk is mixed with a patent food is not sufficient to prevent scurvy. Nor can it be shown that the occurrence of scurvy when fresh milk is thus used is due to the degree of dilution rather than to the patent food, for in some of my cases the milk had been used for many weeks in the proportion of not less than two parts of milk to one part of water, and in others with equal parts of milk and water. The extreme rarity of scurvy from plain boiled milk when used even more diluted than this seems to prove also that the scurvy in these cases in not due to the boiling of the milk but to the addition of the patent food. In one of my cases in which scurvy resulted from the use of diluted milk with Mellin's food, the milk had been heated only to about 167° F. for some months, and had been used fresh without even pasteurization for three weeks before the onset of scurvy (the milk was examined chemically and bacteriologically, and certainly had not been sterilized, and there seemed no ground for disbelieving the statement that it had not been heated, except to the usual temperature of the feeds). The antiscorbutic power of fresh unboiled milk is evidently slight, and is diminished or destroyed by heating, but from the rarity of scurvy on boiled milk compared with the fact that boiled milk is probably the commonest of all infant foods, it would seem that milk has but little tendency to produce scurvy if merely heated to the boiling point for a few seconds, as is commonly done.

In order to prevent the occurrence of scurvy in an infant fed upon some scurvy-producing food, it is advised to add some antiscorbutic food to the diet, and for this purpose raw meat juice, orange or grape juice are commonly used. It seems hardly necessary to point out that the meat juice must be from fresh meat, and probably from uncooked meat; but I have found in at least three instances that some patent meat juice, or one of the concentrated meat preparations which are so widely advertised, was being given with the idea that it would prevent or cure scurvy. As far as I have seen, such preparations are entirely worthless as antiscorbutics. The red gravy from cooked meat was shown to be ineffectual in one of my cases where the child was having one tablespoonful of this red gravy daily as an addition to its diet of Allenbury food No. 2, with one feed of baked flour with water and a little cream. In another case occasional feeds of beef tea had not prevented the onset of scurvy. Even raw-meat juice, unless given sufficinetly freely and regularly, may not prevent scurvy. In one of the most severe cases raw-meat had been given for five months before the disease began; and in the only case in my series which arose on peptonized milk the infant was having a teaspoonful of raw-meat juice three times a day on every alternate day, then, owing to some looseness of bowels, it was ommited fourteen days, by the end of which time the infant showed well-marked scurvy.

Fruit juice, though probably a more powerful antiscorbutic than raw-meat juice, is not an unconditional safeguard. In the case already mentioned where red gravy of cooked meat was being given with the Allenbury food, the juice of two black grapes had also been given daily for four and a half months before the scurvy began; in another case where scurvy had been recognized the juice of four grapes had been given daily for fourteen days with no apparent improvement (on potato there was definite improvement in two days).

No doubt this failure of fruit juice depends upon insufficiency of dose; but it may be that this insufficiency is relative, not absolute—that it requires a larger amount of fruit juice to prevent the scorbutic tendency of some foods than of others. The superior potency of potato as an antiscorbutic seems to me quite certain, but as I have almost always given also raw-meat juice or orange juice my own results do not illustrate this point, and some of them have shown very rapid improvement on orange juice alone. While, however, potato seems specially valuable in the treatment of scurvy, it is less suitable for prophylaxis, for although it is usually tolerated well for a few weeks during treatment it is more apt to cause digestive disturbance than in fruit juice, and is therefore less suitable for prolonged use as a regular addition to the diet.

The potato is prepared by boiling or steaming in the ordinary way with care to obtain a floury potato; the outer floury portion is then scraped off and beaten up thoroughly with enough milk to make a smooth cream, sufficiently thick to pour out of a jug rather heavily—potato 2 heaped teaspoonfuls (with average 2 drachm teaspoon) to 10 oz. of milk; 1½ to 2 teaspoonfuls of this potato-cream are given three or four times daily; after two or three weeks the dose of this should be gradually reduced, and omitted altogether within four weeks from the commencement of treatment. The mode of giving the potato-cream is of some importance; most infants take it best mixed up with the ordinary feed, but if this is done it should be mixed with a portion only of the feed to ensure the whole of the potato-cream being taken, otherwise if part of the food is left the child does not get the full dose of potato. Occasionally it is taken more rapidly given separately; in either case it is often disliked at first, but I have rarely had any serious difficulty in getting it taken. In addition, 2 teaspoonfuls of raw-meat juice may be given three or four times in the twenty-four hours, and sometimes ½ teaspoonful of orange juice two or three times a day, but any looseness of the bowels should make us cautious in adding this to the potato-cream, for diarrhœa in infantile scurvy is a serious complication, as Glisson seems to have observed. At the same time, the child is placed on a diet of milk which has been heated just short of boiling point and diluted with water; the scurvy-producing "food" is of course stopped.

The necessity for moving and handling the infant as little as possible is obvious; the pain caused by pulling on socks, shoes, and tight sleeves, and by bathing is so evident and so piteous to behold that it is only humane to have the infant wrapped in loose clothing and let him lie undisturbed as much as possible; the duration of the tenderness and pain is only a few days after proper treatment is begun, so that all ordinary dressing and bathing and outing may well be in obeyance until all tenderness and pain have gone.

APPENDICITIS AND THE DIFFERENTIAL DIAGNOSIS OF APPENDICITIS IN CHILDREN.*

By Fred E. Sutherland, M.D., Janesville, Wis.

Of all the conditions and complications that arise in children, diseases of the viscera of the abdominal cavity are the most difficult to diagnose. A great number of the diseases resemble each other very closely. The symptomatology of appendicitis is the same in children as in adults, except that pain is very often absent in the former. It may be emphasized that in the beginning of the disease, when the tumor, and perhaps also the other symptoms, are not sufficiently characteristic, especially as the child is generally incapable of localizing the pain, incorrect diagnoses are not infrequently made, and prove momentous to the patient. Indeed, if dyspeptic symptoms predominate, such cases are only too often diagnosed as simply gastric catarrh with constipation, and are carelessly combatted with cathartics. It is therefore important always to carefully examine the region of the vermiform process whenever a child complains of severe pain in the abdomen.

Appendicitis is rare in infants, but it does occur. And at these times we must have a clear-cut idea of the disease and other diseases in which the symptoms closely resemble appendicitis. Among these we find: Colic, acute intestinal indigestion, intussusception and intestinal obstruction, psoas abscess, pleurisy and pneumonia, strangulated hernia, enteric fever, iliac abscess on the right side, hip joint disease, stone in the kindey and nephritic colic, peritonitis and tubercular peritonitis, herpes zoster. The cardinal symptoms of appendicitis are pain, tenderness, nausea and vomiting, rigidity of the abdominal muscles overlying the appendix. As a rule, an acute attack begins with sudden pain located in the vicinity of the umbilicus, but extending over the entire abdomen, more marked in its upper portion, hence the little patient complains that he is suffering from stomachache (gastritis). The pain is spasmodic in character, subsiding and reappearing in what has been described as a wave-like manner. There is an accumulation of gas, and as this moves about the paroxysms of pain are increased. Within twelve to twenty-four hours the symptoms become more and more localized in the right inguinal region.

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*Read before the Central Wisconsin Medical Society.

From the beginning of the attack and throughout the duration of the acute disease, there is tenderness upon pressure over the location of the appendix, if the pressure is made with one finger. The appendix is not always in the same location, but it is much more commonly underneath McBurney's point, consequently one can count upon finding tenderness at that point. The localized congestion in the vicinity of the ileocecal valve prevents the natural passage of gas and intestinal contents from the ileum into the cecum; this in turn interferes with the physiologic process of digestion, and as a result we have nausea and vomiting. We have the same reason for return persistalsis that is present in any other form of mechanical intestinal obstruction. From the standpoint of diagnosis but little dependence can be placed upon the patient's temperature. It is a fact that unless the patient is operated on early he is very likely to develop a temperature which may remain below 100 deg., or may reach as high as 105 deg. or 106 deg. A very high temperature means a grave condition, but a low temperature does not insure the slightest degree of safety. The tongue is usually furred and moist, seldom dry. Constipation is the rule, but the attack may set in with diarrhea, particularly in children.

Upon inspection, the abdomen is at first not abnormal; there is no distention, and the iliac fossæ look alike. On palpation there are usually present from the outset two important signs, viz., great tension of the right rectus muscle, and tenderness or actual pain on deep pressure. The rigidity of the abdominal muscles overlying the appendix is of the greatest importance because it enables us to make an early differential diagnosis. Firm, deep and continuous pressure with one finger over McBurney's point will cause pain of the most exquisite character. Aside from these one usually discovers a swelling in the vicinity of the appendix. This is due, at the beginning of an attack, to the placing of the omentum around the diseased organ and the small intestine around the omentum, and to the contraction and consequent thickening of the overlying muscles. Later on there is a still further increase due to the edema which occurs, and still later to the accumulation of pus, if the process progresses to suppuration. Having freshened our minds on the symptoms and a few general conditions of appendicitis, we will now endeavor to differentiate some of the conditions closely resembling this disease.

Enteralgia (*Colic*).—Colic is a very painful spasmodic contraction of the intestinal muscular structure. It is usually so typical that it can be easily recognized. In severe attacks there is contraction of the features, a loud paroxysmal cry, subsiding for a few moments and then beginning with renewed intensity, drawing up of the lower extremities, and in the male contraction of the scrotum. The abdomen is found tense and hard. With the expulsion of the gas the symptoms subside at once and the child falls asleep. If the attack is very severe we will find prostration, cold extremities and perspiration. Colic is distinguished by the absence of localized tenderness, tumor and fever, by its short duration and by the fact that the pain is less intense. Severe colic with fever in children over three years old should, however, always be regarded with suspicion.

Acute Intestinal Indigestion.—In cases of sudden onset the temperature is invariably elevated—infants, 102 deg. to 105 deg.; older children, 100 deg. to 101 deg. This high temperature does not continue. In twelve or twenty-four hours it subsides to normal or nearly so. The local symptoms are colicky pain, tympanites, and diarrhea. Pain is indicated by severe screaming, crying spells, great restlessness and drawing up of the limbs. The constitutional symptoms are fever, prostration and various nervous disturbances. In older children the pain precedes the diarrhea by several hours and is located in the region of the umbilicus. To differentiate it from appendicitis is very difficult at the onset, and it may be impossible for twenty-four hours. It is impossible to recognize an attack of acute intestinal indigestion until the diarrhea begins. However, the pain of indigestion is rarely so severe, while the fever is higher. It should be remembered that the pain in appendicitis is not always localized, nor is a tumor always in the right iliac fossa. The presence of pain, vomiting and localized tenderness, and the greater severity of the constitutional symptoms, indicate appendicitis.

Intussusception and Intestinal obstruction.—The patient is taken suddenly with severe pain and vomiting, the pain recurring paroxysmally every few minutes. Vomiting is persistent and uncontrollable, the first being contents of the stomach, and afterwards bilious; it may go on to projectile and stercoraceous vomiting. There may be one, two or three loose fecal stools. If anything passes after this it is simply blood or blood and mucus. The general symptoms are those of great prostration or even collapse, pallor, feeble pulse, apathy and normal or subnormal temperature. The abdomen is relaxed; later there may be tympanites. It is diagnosed from appendicitis by the fact that the pain is anywhere in the abdominal region, though usually about the umbilicus, and instead of the elevation of temperature it is normal or even below normal. There is not only constipation, which is absolute in these cases, but no passage of gas occurs, even where, as in appendicitis, there is usually much gas and an occasional action of the bowels from the use of enemata. The tumefaction of appendicitis is always in the right iliac fossa, while the distention of intussusception appears much more like a tumor and is located anywhere in the abdominal cavity, more commonly in the median line on the left side.

Psoas Abscess.—This condition should not be confused with appendicitis. One should carefully inquire into the history and symptoms of the case (lumbar disease). The first symptoms here are pain and lameness, referred to one extremity. In addition to this there is a tilting of the pelvis to one side, and sometimes quite distinct lateral curvature of the spine. The pain is usually not severe and may be felt in the groin, in the loin, in the thigh, in the buttocks or hypogastrium. The gait and attitude are very characteristic. Throwing the shoulders well back, the patient walks stiffly, with short steps, holding the spine with great care. He rises from the floor awkwardly and with difficulty. There is no great deformity until the abscess appears, then it is very apparent. When tubercular lumbar disease is suspected, deep palpation of the iliac fossa should be made to discover the psoas abscess.

Pleurisy and Pneumonia.—These have been mistaken for appendicitis when located at the base of the right lung. There is severe localized pain in the iliac fossa, caused evidently by the pleurisy involving the lower intercostal nerves. This is easily differentiated by a thorough examination of the lungs, and the absence of abdominal symptoms—except pain.

Strangulated Hernia.—All mechanical obstructions of the intestines will lead to paroxysms of intestinal pain. In all, the obstinate constipation must arouse suspicion regarding the true nature of the complaint. To detect hernia a local examination is required, and therefore a careful search at the usual seat of this affliction ought to be made in every instance of severe protracted colic. Lives have been lost in consequence of the neglect of this simple precaution.

Enteric Fever.—To differentiate an attack of typhoid fever from appendicitis is at times exceedingly difficult for the first day or two of the illness; but later the range of the temperature characteristic of the former disease will make the differentiation easy. The Widal reaction is of but little positive assistance here, as it is present only late in the disease; if present, it might be possible to know that it was not produced by a former attack, or, if absent, that it would not subsequently develop. The diagnosis between these conditions is rendered still more difficult by the fact that both may be present at the same time, and the perforation that takes place may be from a typhoid ulcer. Again, typhoid fever will often present very irregular symptoms, and occasionally the diagnosis cannot be positively made until the abdomen is opened. This is especially true where the patient has not been under previous observation, or where no particular symptoms have been noted until perforation has occurred with the sudden development of its symptoms. In such a case no satisfactory opinion can be formed until the abdomen is opened and the site of the perforation found. Fortunately, the positions of the perforation in the two diseases are not far apart, and an incision along the outer border of the rectus muscle will give satisfactory access in either case; the perforation may then be surgically treated whatever its cause may have been. The point—tenderness of appendicular involvement—is of especial value in this differentiation, and is very unlike the general regional tenderness of typhoid fever.

Typhoid fever has its petechiæ, diarrhea, hemorrhages, regular gradation of temperature and its more continuous course. Furthermore, the area of tenderness is greater, the pain and crepitus being somewhat to the left and above that of appendicitis.Constipation is more often the condition in appendicitis and with the exception of the umbilical pain that occurs in some cases, the pain is confined to McBurney's point and immediate vicinity.

Iliac Abscess on the Right Side.—Iliac abscess arises from lumbar caries, the swelling lying in the iliac fossa and pointing above Poupart's ligament. When such is the case it is differentiated from appendicitis in the manner of a psoas abscess. When it occurs from appendicitis it is in the latter stage of the disease, and there should be no difficulty.

Hip Joint Disease.—Hip joint disease may be confounded with chronic but rarely with acute appendicitis. In hip joint diseases the inclination of the pelvis and the inability to move the joint normally furnish trustworthy points of distinction.

Stone in the Kidney and Nephritic Colic.—Nephritic colic is produced when a stone of any considerable size passes from the kidney to the bladder. It is characterized by sudden attacks of severe, sickening pain in the loins, shooting down the thigh or into the testicle. There may be vomiting or even collapse. The urine is passed frequently in small quantities and contains blood. The symptoms quickly subside when the stone reaches the bladder. It is here easily diagnosed by the X-ray. In well-marked cases of kidney stone there is tenderness, pain localized over the affected kidney radiating to the bladder, perineum, and even to the opposite kidney. There may be irritation and contraction of the testicle. Upon examination of the urine after exercise we may find blood, pus and epithelial cells from the pelvis of the kidney. These are differentiated from appendicitis by absence of bowel disturbances, tumor, and its short duration.

Peritonitis.—The onset is nearly always abrupt, with fever and vomiting. As a rule, the temperature is high—103 degrees to 105 degrees. Vomiting may occur only at the onset, but it often continues and is of a greenish material. There is severe pain, which may be general or localized. The abdomen very soon becomes smaller and tympanitic. The distention is uniform, may be irregular, but is a constant symptom. There is tenderness on pressure and marked rigidity of the abdominal walls. The bowels usually are constipated, but there may be diarrhœa. The urine may be retained or frequent micturition may exist. The symptoms from the beginning indicate a severe disease. The pulse is small, rapid and compressible. Prostration great; face is pinched. The mouth is drawn and features indicate great pain. In severe cases there may be hiccough, cold extremities, clammy perspiration and collapse. The mind is usually clear. It is diagnosed from appendicitis by its rapid onset, general distention of the abdomen, soreness generally, absence of tumor on the right side. Both rectus muscles rigid. Later, if a severe case, there is a sufficient amount of fluid present to give the sensation of fluctuation.

Herpes Zoster.—Herpes zoster of the twelfth dorsal nerve may resemble appendicitis early. Later we have the severe neuralgic pain, characteristic eruption, differentiated from appendicitis by absence of tumor, bowel disturbances and fever.

An abscess in the abdominal wall furnishes many of the signs of abscess around the appendix. The most trustworthy point of distinction is that the former moves with the abdominal wall and is unassociated with intestinal irritation.

ON DISORDERS ASSOCIATED WITH PRIMARY* DENTITION.

By Leonard Guthrie, M.D., F.R.C.P.

A hundred years ago, the great majority of all ailments to which infants are liable were attributed to the effects of dentition. The mortality from this cause alone was placed as high as 50 per cent.

About 50 years later, however, it was announced as a discovery that, after all, dentition was but a physiological process, and, as such, it could not very well be fatal, or even dangerous to life.

This produced a reaction. Although infants continued to suffer and to die, as still they do, of convulsions, meningitis pneumonia, pulmonary, gastric, and intestinal catarrh, during the period of first dentition, these illnesses were no longer attributed to "breeding of the teeth." Dentition rarely finds a place in death certificates now.

Yet the public—whose information on medical matters is usually a century behind the times—still persist in regarding all complaints in early infancy as due to teething. "Is it his teeth, or is it consumption of the bowels?" "He always cuts his teeth with convulsions or bronchitisa g e shrdlu hrdlu hrdlu rdluuuuu it was only a teething rash"—are all common questions, and statements of which many of us must have grown weary, much as the Athenian tired of hearing Aristides called "The Just." Possibly, therefore, we may pay less attention to the phenomena of dentition than the subject merits.

Truth and fallacy, like poisons and their antidotes, often grow side by side.

Dentition is a physiological process, and, as such, is often accomplished without any disturbance to the infant's health.

On the other hand, it is futile to deny that it is often associated with considerable pain, constitutional disturbance, and local signs of inflammation in the gums.

In enquiring why this should be, we are handicapped, at starting, by want of knowledge as to the exact method by which the eruption of teeth is effected.

Does the process resemble that which obtains in sharks, in which the mucous membrane, to which the teeth are attached, and of which they are a part, is shed in layers, thus bringing successive rows of teeth to the surface?

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*Practitioner.

At all events, the shedding of the temporary teeth in human beings seems analogous.

Do teeth arrive at the surface through successive additions to the length of their fangs? Against this view, it has been urged that, occasionally, unerupted teeth are found with perfectly developed fangs. Yet this condition may be but as exception to the rule.

We may safely say that the old view that teeth literally pierce the gums—as a blunt awl might be driven through a cowhide trunk—and that all troubles, which may accompany teething, are due to resistance afforded to a tooth by a tough unyielding gum, is erroneous.

No gum, even if as tough as a turtle's could withstand the passage of a tooth.

The superstrata of the gum over a tooth are gradually absorbed, or atrophied, not pierced. The process has been attributed to the action of phagocytes, but on what evidence I do not know.

The idea that teeth may be "liberated," or their eruption hastened, by lancing the gums must be discarded.

We must, however, leave undecided the exact nature of the forces which are concerned in dentition. We know no more about them than we do of those which determine physiological processes elsewhere, such as the development of function in the salivary glands, the intestinal glands and the nervous system.

What is the immediate cause of painful dentition?

Some have held that a tooth acts like a foreign body, and causes pain by forcing its way through its closely packed neighbours in a small and over crowded jaw. I am not prepared to deny this altogether, for it is well known that an impacted wisdom tooth may give rise to much distress in after life. Yet, I think, an analogous condition in primary dentition must be rare, because, as a rule, the infant's pain arises, when the tooth has outsoared its neighbors, and in nearing the surface of the gum.

I doubt again that pain is produced by resistance to the passage of a tooth by the gum above, unless indeed the gum be inflamed, for surely the resistance offered to the permanent teeth, by the deciduous teeth above them, must be far greater than any which the gum itself can afford. Yet eruption of permanent teeth is painless, unless the temporary teeth are carious, or the gums are ulcerated.

The inference, therefore, is that dentition is painful when the gums are so.

SYMPTOMS OF PAINFUL DENTITION.

The normal healthy child may have none save salivation, and the satisfaction which the child derives from biting and munching anything which he can put in his mouth.

If fretful, it is because he is not supplied with something to bite. A hard crust at once brings contentment. Mastication may accelerate the process of dentition, and Hippocrates was probably right in assuming that in these circumstances the gums itch. They are not, however, red or swollen, tender or dry. Pyrexia is absent.

The condition of a child, in whom dentition may be really painful, is wholly different from the above. Here the gums are swollen, tender, and reddened. They are dry, or covered with thick and slimy mucus. Salivation seems suppressed. Frequently this condition of gingivitis affects the gums as a whole. Less frequently, it is most marked over the site of an erupting tooth. One cannot doubt that, under these conditions, dentition may be painful. The child is restless, sleepless, or wakes at short intervals, screaming with rage and pain, and driving its parents to distraction. It ejects its "comforter," and the nipple of the brest, or bottle, with an angry cry. Evidently, pain and tenderness of the gums are increased by pressure. Often he pulls, and rubs his ears, or the back of the head, showing that his sufferings are referred to these parts.

The temperature is often alarmingly high, rising to 104° or 105°. With pyrexia there are, I believe almost invariably, signs of gastro-intestinal disturbance, such as vomiting, with diarrhœa, and loose, offensive, green and curd-containing motions, and griping colic. Sometimes there is obstinate constipation. Signs of pharyngeal, laryngeal, tracheal and bronchial catarrh are common enough. Nervous symptoms such as laryngismus, spasmodic cough, squint, muscular twitchings, tetany, convulsions may occur but it is worthy of notice that these are far more prominent in edentulous, rickety subjects than in those who are cutting teeth.

The popular superstition that rickety children, who suffer from any or all of these symptoms, "cut their teeth in their loins" was no doubt invented by some medical man in bygone ages, in order to account for the fact that the teeth, which he had confidently predicted, failed to make an appearance in their normal site.

Convulsions are far more common in infants below the teething age than during it.

All the symptoms which have been mentioned, and many others, including so-called "teething rashes," which comprise every variety of dermatitis and exanthem; meningitis of every sort and kind; encephalitis, infantile paralysis, hemiplegia, paraplegia, diplegia, eye affections, such as keratitis, iritis, and optic neuritis; ear affections, such as otitis media and mastoiditis; pulmonary diseases of every kind have been attributed to teething. In short, there is no disease for which dentition has not been held to account. Of pulmonary disease, perhaps lobar pneumonia, and particularly apical pneumonia, have most frequently been mistaken for teething, the reason being that until within recent years its existence was denied in infants under two. Yet of all complaints in infancy, lobar pneumonia yields most striking indications of its presence.

When, however, pneumonic delirium has been mistaken for meningitis, and a crisis has happened with the eruption of a tooth, or has followed lancing of the gum, no doubt the happy event has been held to justify both diagnosis and treatment. One can only thus account for the strange conviction, dear to our parents and their medical advisers, that infants' lives are saved by timely use of lancets.

It would be strange indeed, if teething did not often co-exist with every illness in infants aged from eight months to twenty-four. Yet I am convinced that, in the vast majority of cases, teething is a mere coincidence. It is chiefly of importance when it occurs through inflamed gums.

One sees countless cases in which teeth are cut in the course of any kind of illness, but without influencing its duration, and without evidence of alveolar inflammation. On the other hand, it is equally certain that alveolar inflammation and, therefore, painful dentition, are associated with every kind of illness, and with gastro-intestinal disturbance in particular.

This fact is admitted even by those, who are not disposed to regard dentition as the source of all evils—and the folowing explanations have been offered of coincident disorders:—

(1) *The Reflex Theory.*
(2) *The Pyrexial Theory.*
(3) *Idiosyncrasy and General Nervous Instability.*

The reflex theory is fascinating in its simplicity and plausibility. The trigeminal nerve, which supplies the jaws and teeth, has extremely wide anotomical connections, as everyone is aware. It would be tedious to enumerate them. One need only allude to its communication with the fascial, glosso-pharyngeal, and vagal nerves; with the sympathetic supplying the iris, at the gasserian ganglion, with the nerve to the membrana tympani through the otic ganglion.

Moreover, the nerve is not far from its origin in the medulla, where its nucleus is in close proximity to other important nuclei, and also to the base of the brain. Such being the case, it seems plausible to attribute all complaints of parts, however remote, to reflected irritation of the fifth nerve.

There may be a certain amount of truth in this, but it is not the whole truth. No doubt irritation of the dental branches of the fifth may produce otalgia, but it cannot produce suppurative otitis media. In rare cases, it may give rise to convulsions, but it cannot cause meningitis.

Spasmodic asthma, were the theory true, should be excessively common in teething infants, but it is of the utmost rarity. Pneumonia cannot be brought about by reflex irritation of the vagus. Whilst laryngismus and tetany, as beforementioned, are practically confined to rickety children in whom dentition is delayed. And these are complaints which might well be produced by reflex irritation.

One may admit at once that pain in any part may be transferred elsewhere, yet disease is not set up in the remote part to which the pain may be referred. Pain, in early hip disease, is commonly referred to the knee, in renal colic, it may be felt in the testicle, yet neither knee nor testicle is actually diseased. John Hunter's usual astuteness forsook him, when he attributed relapsing urethritis exactly resembling gonorrhœa, to the effects of teething.

The reflex theory will not wholly account for all the complaints which exist with painful dentition.

The pyrexial theory, again, is not entirely satisfactory. It is held that dentition produces high temperature, the pyrexia predisposes the patient to chill, and that chill results in catarrh and inflammation of pulmonary or alimentary systems. Here again the explanation is not quite acceptable. Why should dentition be associated with pyrexia? It certainly is not so unless painful, and why is it painful unless the gums are unhealthy and tender? Modern experiments seem to show that chill is not the potent cause of catarrhs and inflammation, which it was formerly held to be. They are due to microbic invasions, and not to exposure to cold alone.

Lastly, we have the theory that children at the dentition period are in a condition of exceptional susceptibility to various complaints, because not only their teeth, but the glands of the alimentary tract, and their nervous system are undergoing physiological development.

Such physiological processes, without doubt, are proceeding, but it seems unjustifiable to blame nervous, or intestinal instability, when other, and more obvious, causes of illness may be found. I doubt if any previously healthy child suffers by reason of the "instability" of its nervous system, or the development of its physiological functions. If there is any special susceptibility at this age, it is to the ill-effects of sour milk and improper food, which susceptibility need not be regarded as an idiosyncrasy. This I believe to be the crux of the whole matter.

In my personal experience I can hardly recall a case of painful dentition, which has not been accompanied, and usually preceded, by gastro-intestinal disturbance.

It is in connection with constipation or griping colic, diarrhœa, with offensive, green, curd-containing stools, that we find dry, tender, swollen gums, which, in my opinion, render the eruption of teeth painful. Over and over again, mothers have complained that, whereas a child has previously cut several teeth without discomfort, on this particular occasion a tooth is being cut with diarrhœa, and all the familiar symptoms of fever, fretfulness, insomnia, screaming, perhaps convulsions, and obvious pain in swollen, inflamed gums. In practically all such cases, improper diet or tainted milk is the cause, and the symptoms speedily subside under castor-oil and careful dieting.

One is compelled to regard the oral condition as part of the intestinal, rather than to consider the abdominal symptoms as due to reflex irritation from the gums.

In favor of such a view may be mentioned the well-known fact, that, in adults, a raging toothache may often be relieved by a brisk purge. Sir Lauder Brunton explains this by supposing that "The state of the nervous system is so altered by the purge that pain is no longer produced by the irritation."

Yet I venture to think that a more reasonable explanation is that the cause, which irritates the intestines, irritates a tender tooth—and that this cause is remoed by the purge.

It must be a common experience that acute indigestion gives rise to tenderness of gums, toothache, and neuralgia. The mouth is part of the alimentary tract, and the teeth and gums are part of the mouth, and therefore share in the general disturbance caused by indigestible and irritant matter in the intestines.

I believe, therefore, that the ordinary phenomena of painful dentition are dependent on alimentary disturbance, and that dentition is painful because the gums become unhealthy.

Assuming this to be true, it affords an explanation of many of the more serious complaints, which occur together with painful dentition.

If the oral mucous membrane is unhealthy, it must follow that it is unable to cope with the invasion of microbes. As previously mentioned, salivation seems suppressed during painful dentition, and healthy saliva has, no doubt, antiseptic properties. Hence we can easily see why infants, whose teething is painful, fall a ready prey to catarrhal inflammation of the ears or lungs, to pneumonia, and meningitis. A sore mouth readily becomes septic. With regard to ordinary infantile convulsions, attributed to teething, I am convinced that gastric, or intestinal disturbance, is far more frequently the cause than dental irritation.

TREATMENT

If the foregoing conclusions be correct, the success of ordinary methods of treatment in cases of painful dentition is explained, and, possibly, some of the more remotely associated affections may be prevented by attempts to render the mouth aseptic.

General preventive treatment consists in scrupulous attention to form the mode of preparation of diet. If the child's food is unwholesome, its alimentary tract will be unhealthy.

When sour milk in unclean bottles has set up diarrhœa and colic, the best remedy is castor-oil in emulsion with a little tincture of rhubarb.

R. Olei Ricini	m. x.
Tinct. Rhei	m. v.
Glycerini	m. v.
Tragacanth	gr. ½
Aq. Menth. Pip.	ad ʒ i.

To this may be added Tr. Opii, in doses of 1 or 2 minims, if pain is extreme. The prejudice against giving laudanum to infants is groundless, except perhaps in those under the age of dentition. There is little danger in giving it even to these, provided that the dose be not too large, and that it be not repeated, until drowsiness produced by it has passed off.

Salol may be added to the mixture, when motions are peculiarly offensive, and bromide of potassium, when restlessness and sleeplessness are pronounced.

Oral hygiene is of the utmost importance in teething infants. That which entereth the mouth defileth, and a teething baby puts everything therein which is possible of insertion.

Hence a reasonable discretion should be used in the selection of articles supplied for the purpose.

Rubber rings, "comforters," dolls' heads and the china ornaments on the mantelpiece should be washed before sucked. There is danger in the oft-sucked toy.

Nurses, who possess a very Baalbec of ruined teeth, should not indulge in preliminary suction of the bottle to make sure that the nipple draws, and that the milk is to the baby's liking.

Even "Walker-Gordon" milk should not be stored in the lavatory, the outside, as well as the inside of a feeding bottle should be kept clean. Every baby should possess its own pocket handkerchief, and a badger-hair gum-brush.

When the gums are painful, tender and congested, they should be brushed with a solution of 10 grains of chlorate of potash to the ounce of glycerine of borax.

Should ulceration be present, the addition of 20 to 30 grains of resorcin to the above, and of a few grains of chlorate of potash to the castor-oil mixture, are most efficacious.

GUM LANCING.

In the *American Journal of Dental Science,* it is said, p. 327, that: "Many lives of children are probably sacrificed yearly, because of the popular and professional prejudice against lancing." Such statements are pious opinions which lack confirmation.

Personally, I have grave doubts that painful dentition has ever been the direct cause of death, or that life has ever been saved by lancing the gums. Even the oft-quoted cases of fatal so-called "teething convulsions" are, in my experience, attributable to gastro-intestinal disorder. It is difficult to believe that "threatened meningitis," whether tuberculous or otherwise, has ever been averted by use of the lancet, or that the crisis in pneumonia can be hastened, or diarrhœa cured, by such procedure. At the same time, there can be no doubt that local pain may be relieved by blood-letting.

Simple scarification of the gum is all that is needed. Such barbarous usage as the removal, between elliptical incisions, of a portion of gum over a tooth, supposed to be offending, is not to be commended. As well as being cruel, it is illogical; for if the condition of the gum were merely that of tension over a tooth, a simple incision should gape at once, and so relieve the symptoms.

Gum-lancing should not be practised in the absence of local indications for its use, and merely in blind hope of relieving "constitutional symptoms and distress not otherwise accounted for" (*Op. cit.,* p. 327). If unaccounted for, further investigation is required, not stabs in the dark. At the present time, it is hardly likely that the purple hæmorrhagic swellings of the gums, met in infantile scurvy, should be mistaken for signs of disordered, dentition, requiring local venesection. Yet there is ground for suspicion that, in former days, many a case of scurvy was so maltreated and ended fatally.

SOME OBSERVATIONS ON PYREXIA AND SUBNORMAL TEMPERATURES IN INFANCY AND CHILDHOOD.*

By Wm. A. Northridge, M.D.

Very slight causes will elevate or depress the temperature of the healthy child. Heat applied to the surface of the child may send the temperature up two to five degrees and, *per contra,* cold applied thus may reduce the temperature two to five degrees. A baby's temperature is exceedingly unstable and it may be stated that the younger the child the more easily varied the temperature. The older the child the nearer it approaches to adult stability.

A baby's normal temperature varies from 98 deg. to 99 deg. F. There is apt to be an evening fall of a degree. For the first five months of life the temperature varies greatly from slight causes. After this, the older the child and the more stable the nervous system the less the variations from slight causes; but up to the sixteenth year there is more or less susceptibility to high elevations from comparatively slender causes. Starr truly remarks, "Without doubt, during the period of active growth, heat regulation is highly unstable, and the temperature consequently more labile than at other periods of life." It would seem to be true that the process of growth causes pyrexia at times. Of course, the more stable the nervous system, the less the variations in temperature from this cause.

As an instance of how nervousness will run up a temperature in an infant, I observed recently in dressing a case of resection of a rib, that the temperature would run up from normal to 102 deg. from fear and excitement, subsiding in a few hours to normal.

I think too much importance is given sometimes to a temperature readings, and I believe it is not wise for the relatives of the sick child to watch the temperature too closely. Elevations, which, perhaps, are anticipated by the physician and which are inevitable in the progress of the case in hand, cause an enormous amount of worry in the minds of the attendants, a good portion of which is sure to rebound upon the doctor. The indiscriminate handing out of clinical thermometers to patients, as is the habit with some, with the remark, "You must take the temperature so often and if found so high, send for me," will tend to wear a man out unnecessarily and is sometimes adversely criticized. Of course, we all meet cases where it is eminently proper to have the temperature taken frequently and regularly for a time.

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*Read before the Pediatric Section of the Medical Society of the County of Kings.

Too much importance may be laid upon the temperature in the professional mind also. It is a fine point to know just how much significance to give to a fever in a child. Often a high temperature reading is not either important or dangerous as will be quickly discovered if the child be watched. If a baby with a temperature of 104 deg. and upwards is playful, unconcerned and not wasting, one may be sure that a trivial cause is at work and that the fever will soon subside. The prognosis is good. So it should be borne in mind that slight causes will sometimes run a baby's temperature up very high and little discomfort or danger to it.

In judging then, of the symptomatic value of pyrexia in the young, we should observe its effects and the effect of the disease present upon the patient and so be able to judge of the gravity of the case; paying more attention to the effects of the fever than its height, and always bearing in mind that high fever is a common symptom in the diseases of infancy. The younger the child, of course, the truer all this is.

The thermometer readings in the young, because of this great susceptibility to pyrexia, are not of such value in diagnosis and prognosis as in the adult. Nor can the severity of the disease always be judged by the temperature range. A very serious disease may be present, as enteric fever or pneumonia, and yet the temperature may be distinctly atypical, perhaps not read higher than 102 deg. F., although the case may terminate fatally and the diagnosis be proved by the autopsy. A well-known example is tubercular meningitis. I have attended a case of this disease where the temperature never went higher than 100 deg. F.

As a rule children with fever perspire comparatively little and so are not relieved much by evaporation. For this reason the skin often has a pungent burning feeling when fever is present. On the other hand, radiation of heat in the child is immense, accounting for from 60 to 70 per cent. of the heat lost. The more the skin is exposed, the greater the radiation by the cooling of its surface; again, the cooler the surrounding air, or water, if the child is in a bath, the greater the amount of heat lost. Carrying a sick baby through the streets in cold weather will frequently run the temperature down several degrees. I shall have more to say in regard to this phase further on.

Pyrexia in the young is apt to take on irregularity. The temperature is apt to show surprising and great remissions, and at some hour in the day is apt to approach the normal to within a degree or so. This is the rule to which there are, of course, exceptions. A series of careful observations has impressed me with the belief that if possible the temperature of a child should always be taken in the rectum, giving the thermometer two more minutes than it calls for. The rectal temperature informs one of the very worst there is to know, running about one degree higher than when taken in the axilla and one-half degree higher than when taken in the mouth. We are informed of hyperpyrexia and it also helps us in making our diagnosis, informs as to the severity of the case, and if no fever be present, we are sure in most instances that no serious disease is imminent. In order to be sure that the highest and lowest temperature has been recorded in the case, it is sometimes necessary, for instance, before the diagnosis is made with certainty, to have the nurse use the thermometer every three hours for a day or two, because these variations *may occur any time in the twenty-four hours.* In this way only can we be sure that the highest and lowest temperature has been recorded.

As to the prognosis, Sturges lays down the following rules. "The pyrexia is good, *caeteris paribus*, which is lower in the morning than in the evening; which is equable, with but slight variations from day to day; which has a single rise and a single fall in twenty-four hours and whose lowest morning level approaches the normal line. The pyrexia is bad, *caeteris paribus,* which is highest in the morning, which ascends from evening through the small hours; which has two or more rises or falls for one day and night; which either maintains its level above 103 deg. F. pretty equably for many hours together or else is very variable from day to day, and conformable to no pattern." Temperatures below 102½ deg. F. may be expressed as moderate. If amounting to 104 deg. or 105 deg. F., severe, and if running up to 106 deg.. 107 deg. F. or above, decidedly dangerous.

While a temperature of 106 deg. F. is quite often seen by the pedatrist, and often with recovery following, much above that in my experience is generally followed by a fatal ending. A sustained high temperature, decidedly above 103 deg. F., and ranging upwards at times to 104 deg. or 105 deg. F., is cause for serious thought and careful treatment, for while fever is but an important symptom, a maintained high temperature is very destructive, fairly burning up the tissues. If the cause of a fever can be ascertained, and that cause be a removable one, it is a pleasant duty to treat the fever. Thus castor oil and calomel quinine and the salicylates do yeoman service where indicated. Aconite and digitalis are also sheet anchors. Diuretics, diaphoretics and laxatives are all very useful where indicated. In my experience it is never necessary and would be often dangerous to use the coal tar products to reduce the temperature in the fevers of infancy. I merely mention them to condemn them. Fever calls for active treatment for the reduction of the temperature when the elevation causes certain symptoms or when it is so very high that the swift and soon production of such symptoms may be anticipated. These symptoms are principally drowsiness, delirium, convulsions, rapid and weak heart action, restlessness, and sleeplessness. *Per contra,* if the child is calm, smiling and restful, too active interference is unnecessary. Hyperpyrexia should always be combated as the body rapidly wastes when it is present.

As to food, nothing need be said in this presence, save to remark that I personally believe that food very often acts injuriously, increasing the fever when given in a solid form or in an improper form, or in too great quantities in fever cases. Witness the favorable drop in the temperature often following the use of a laxative, with complete withdrawal of food for a few hours. Fever consumes tissues to be sure; but the repair process must be gone about very carefully and slowly or we will but burden the exhausted organism and thus increase the fever and exhaustion.

While perspiration is slight, as a rule, in children, the skin is apt to be full of blood and to feel dry and hot. Pungent is the word that best expresses the sensation given on touching such a skin. In some cases the skin is pale. A bath with friction will send the blood into the skin. The friction is as important as the bath. The cold friction bath is our best measure for the relief of fever in the cases where it is dangerous because of its height and persistence. Properly given, the temperature in almost every case where it is used, will drop, commonly from two to three degrees and sometimes more, and the patient will fall asleep. Barusch gives the technique as follows: A suitable tub is filled three-quarters full of water at a temperature of 95 deg. Give the baby ten minims of whisky. Strip off the clothes and place it in the water with its head resting on the left arm of the nurse, while with her right hand she makes gentle but persistent friction all over the child's body. The water is reduced to 85 deg. by adding cold water or ice to the bath. The duration of the bath should be five minutes for a weak and ten minutes for a strong child. The baby should then be removed from the bath and wrapped up well in a sheet and blanket, and a hot water bottle put to its feet. Generally the child will lose all nervous symptoms, the face will assume a placid, restful expression and a quiet sleep follows. "Prolonged shivering after the bath means that either the bath was too long or the temperature was too low." "Cyanosis of the face demands cessation of the bath." "Chattering of the teeth demands cessation of the bath." Crying should not be heeded. The reduction of temperature by irrigation is in many cases very effective, and should always be tried faithfully before the cold bath be used. Positive instructions should always be given that the lower end of the irrigator be not placed higher than 1½ feet above the anal opening. The water should be used at a temperature of 95 deg. and should be encouraged to gush out alongside of the tube whenever the rectum fills, by pressing the tube gently to one side. In this way about a gallon should be used. Sometimes irrigation given most carefully, fails to make any great impression upon the temperature. It is then well to repeat the procedure within three hours. If this does not bring the temperature down materially, irrigations should be abandoned in that particular case and other measures resorted to.

The alcohol and water sponge bath is very efficient in some cases, being all they need. It should always be tried before using the cold bath. It is always grateful to the patient, never frightens and will quite often reduce the temperature to within safe limits. Like irrigation, it is of much more value in some cases than in others as a febrifuge. Lavage will reduce temperature in cases where it depends upon conditions in the stomach such as irritating food or masses of mucus. The child will almost always fall asleep afterwards.

Where intestinal infection causes the fever, enteroclysis is of great value, washing out all irritating and infectious material. Besides using the same precautions as in giving irrigations, the water should be boiled a long time, sterilized, and should be used at a temperature of 98 deg. F. The addition of a drachm of salt to the total quantity of water is said to render it more soothing. The salt should be boiled with the water.

Subnormal temperature is deserving of more attention that has been given to it. Some children die with the temperature very much subnormal. This is particularly true in the wasting diseases where the vitality is brought very low. The principal conditions in which the temperature is apt to be found subnormal are exposure to cold, severe fluxes, malnutrition, athrepsia, prematurity, inanition, collapse, heart disease, anemia, hemorrhage and for a short time after acute diseases. A temperature persistently below 97 deg. shows a serious failure of the powers of life and, in those cases where the mercury fails to leave the bulb, death soon takes place. In premature cases a constant subnormal temperature is a bad sign.

I was drawn to study subnormal temperatures by noticing that many of those brought to the Babies' Hospital during more particularly the cold months, had temperatures decidedly subnormal, due to the exposure incident to the journey from their homes. For instance, a malnutrition case was brought in during January and, on attempting to take the temperature, it was found that the mercury would not leave the bulb. In January a premature baby was brought in with a temperature of 96; another in November with a temperature of 94; another in January with a temperature of 95 2-5. In November another admitted with a temperature of 94 1-5. Three hours later the temperature was again taken in this case, and 99 deg. was recorded. One in October showed 94 3-5 deg., six hours later 98 1-5 deg was recorded. In January a case came in with a temperature of 95 2-5, three hours later the temperature reached 98, and so the list might be extended. I have picked out 25 of the lowest of these subnormals and they show an average temperature of 95 2-5 deg. on admission. Surely, all things considered, I would rather treat a child with an elevation of temperature of six degrees than one with a depression of a like amount.

The quickest and best way to bring the temperature up to normal in these cases is to give whisky and strychnine and to place the patient in a mustard bath at a temperature of 105 deg. for five minutes. Gentle friction should be made. The child should then be wrapped in blankets. The bath will elevate the temperature several degrees and stimulate the powers considerably. In one case which I observed, where the temparature was 96 when the child was placed in the bath, the procedure brought the temperature up to 101.

SOCIETY PROCEEDINGS

Meeting of the Bethesda Pediatric Society, of Dec. 21, 1906.

Held at DR. ALBRECHT'S office, Humboldt Building.

The President DR. GEO. M. TUTTLE, in the chair.

A case of so-called Cyclic Vomiting with Hepatic Insufficiency." Paper by Drs. E. W. Saunders and W. L. Johnson, read by Dr. Johnson. The history of a boy was given, aged two years, who, up to this time had had several attacks similar to the ones about to be related, but, as they were not under his observation, Dr. S., simply gave the mother's history of them. The first attack, October 1905, was at his home. Prior to this, his diet was very simple, milk, stale bread, asparagus tips, spinach, baked apple, soft boiled egg and perhaps, a little scraped beef. There was severe repeated vomiting, some abdominal distress at onset, temperature 99.4 to 100.4, great depression, insomnia and thirst. October 9, he was brought to St. Louis. In spite of rational measures he continued to vomit until October 10, 6.30 P. M., when the stomach was washed. After this he retained a little apollinaris water and champagne. From October 12 to 14, he improved rapidly and he went home on the latter day. The urine was examined for albumin, sugar, casts and acetone, but none found. Not finding acetone caused Dr. S. to disregard cyclic vomiting for the time, and since the child has been given large doses of Fowler's Solution, he concluded it was a case of arsenical poisoning. March 23, 1906 the boy had another attack and this time acetone was found and since this there have been repeated attacks, acetone and diacetic acid being found in every instance, during and for some time after the attacks. Finally on account of the evidence of hepatic insufficiency as evidenced by the clay-colored stools, Dr. S. used Sodium glycocholate with apparently excellent results, the boy improving very materially, and the attacks with but one exception, not recurring.

Further remarks on this interesting case were made by Dr. Saunders, and Dr. Warfield spoke of data that had been gained by numerous examinations of the urine and stools. He added: "There is one point that strikes me as being of particular interest, namely, the complete acholia; the stools reminded one of a case of severe catarrhal jaundice. There was the same odor, pasty color, greasy appearance that characterizes the discharges of such cases. In spite, however, of this condition of the stools there was absolutely no juandice in the child, not even the conjunctivæ were colored. It was apparently a total suppression of the secretion of bile, the cause of which was absolutely unknown. Knowing that the bile salts are the true stimuli of the bile secretion, that these salts poured into the intestines are not lost, but are absorbed in the blood to be again stimuli for the bile, it occurred to me that sodium glycocholate might possibly be of value in the treatment. Certainly it would do no harm, and it seemed a rational method of procedure. Combined with this was suggested resorcin as an intestinal antiseptic. However, this was not well borne, and Dr. Johnson later substituted slupho-carbolate of zinc. It is exceedingly interesting that under this treatment the child has been perfectly well, and has not had up to this time a return of the attacks to which it has been previously so subject. It was unfortunate that the $N.H._3$ content of the urine as not quantitatively estimated. If the liver is at fault it might be that, as Dr. Williams of Baltimore has shown for pernicious vomiting of pregnancy, the free $N. H._3$ is excreted in large quantities. In future, I believe this is a point to be borne in mind.

The urine showed a great amount of acetone and diacetic acid, but curiously enough, not until the second day of the August attack and after much alkali had been administered and retained. We found no indican, but microscopically in one specimen cystin crystals were seen.

Dr. Zahorsky related a case in which, several years ago, he had diagnosed this disease, and spoke of the relation of acetone in the urine to this condition.

Dr. Bleyer drew attention to a puzzling condition in these cases, namely, that, although it seems most probable that an hepathic insufficiency exists and may be the starting point of disturbances, that certain of the functions of the liver seem to continue undisturbed. For example, should liver action be interfered with we should expect a diminution in the production of indican, which, on the contrary seems to incresase with the gravity of the cases. Again, sugar metabolism does not seem to be interfered with, sugar is not found in the urine of these cases. Especially should variations in these functions be observed if, as Rudolf Fischl and Bayrac think, they are of purely nervous origin.

Dr. Saunders spoke of the signs of hepathic insufficiency and pointed out that cystin found in the urine of this case gave additional weight to the interference with liver function.

Dr. Tuttle said that he thought that the disease (cyclic vomiting) was much more common in infants than was recognized, and had no pathognomonic sign. He thought that many mild cases existed and the condition should be kept always in mind. He recalled half dozen cases of this trouble. Whatever the source of the trouble, he felt that Nature was trying to rid the stomach of some injurious substance. In one of his cases, the mother of the child is always able to tell when an attack is coming on by the irritability of the child, and in another, by the odor of its breadth.

A. S. Bleyer Secretary.

EDITORIAL

CHILDREN AND DRINK

A month ago a seven-year old boy in a fit of anger drew a revolver and shot and killed his mother. Within a short and recent period of time, in New York City, six boys, in age ranging from seven to fourteen years, were convicted of burglary, two boys, aged fifteen and seventeen, were found guilty of assault and highway robbery, and three boys, ten, fourteen and sixteen years of age, were convicted of murder. Less sensational, but of no less vital concern, are the facts regarding the prevalence of organic disease among children. Of 10,000 children in city schools, 35 per cent. have diseases of the heart; 20 per cent. have spinal defects; 27 per cent. are tuberculous; 60 per cent. are anemic and 80 per cent. suffer from some neurosis. Should the children thus affected be excluded from attendance, two-thirds of these schools would be compelled to close for lack of pupils.

The figures here presented were compiled by Dr. Alexander MacNicholl, of New York City, in the course of an investigation into the relation of alcohol to the disabilities of school children, which is fully reported by him in a recent issue of the Journal of the Association. Basing his study upon the universally recognized connection between the use of alcohol and a deterioration in physical, mental and moral condition, Dr. MacNicholl set out to trace the actual degree and extent of its evil influence. For convenience, he made a rough division of children into two classes: first, those in good circumstances, and second, those in poor circumstances; and, making preliminary inquiries into the general personal habits of the children, in order to contrast their probable capacity for resisting temptation, he found in the first class 30 per cent. of boys who smoked, and 6 per cent. who did regular work after school; in the second, 80 per cent. of boys who smoked, 25 per cent. of the boys and 47 per cent. of the girls who worked after school hours. Some of the lads from ten to fourteen begin work at four or five in the morning, attend school during school hours, and resume work in the afternoon to labor until nine or ten at night. The average amount of rest secured by these boys must be very small. A half dozen of them were shown to have only three or four hours' sleep in the twenty-four, and their day's work such as to try the endurance of an ordinary man. What wonder if they and their fellows grow up out of harmony with law, seek pleasure in devious moral ways, or abandon themselves to lives of crime?

As for the extent of the drinking habit proper, it was found that of 34,000 children in the first or more prosperous class, 73 per cent. were total abstainers, 23 per cent. drank beer, 4 per cent. drank spirts and 12 per cent. drank beer and spirits both. Of 6,879 children in the second class, 50 per cent. were abstainers, 43 per cent. drank beer, 7 per cent. drank spirits and 40 per cent. drank beer and spirts both. In this class 36 per cent. of the Americans and 50 per cent. of the foreigners drink. 90 per cent. of the drinking Americans have foreign parents and grand-parents.

Scientific instruction in the laws of health and the effects of alcohol and other narcotics has resulted in a very perceptible increase in the number of abstainers and improvement in the hygiene of the home. Some teachers report 20 per cent. less drinking among their pupils now than five years ago, and a consequent improvement in the grade of work secured, for beer-drinking children are notoriously sluggish in their mental habits, and spirit drinkers gravitate into habits which seriously impair the higher intellectual properties and cloud the judgment. The dullness is perceptibly increased when the drink habit is linked with an hereditary alcoholic taint. From 15 to 25 per cent. of children who drink, but who are free from any hereditary alcoholic taint, are dullards, while from 53 to 77 per cent. of children with a drinking ancestry are dullards, and in the case of children with a totally abstaining ancestry we have only from 4 to 10 per cent. of dullards.

An inquiry into the drinking habits of the parents of these children, so pointedly suggested by the figures last given, furnished one more striking illustration of the inevitable influence of heredity. The history of ten families of totally abstaining parents ran as follows: First generation, 34 children, of whom 11 per cent. suffered from organic or functional diseases; second generation, 38 children, of whom 26 per cent.

suffered from organic or functional diseases; third generation, 58 children, of whom 7 per cent. suffered from organic or functional diseases. Ten families of moderate-drinking parents showed the following history: First generation, 47 children, of whom 59 per cent. suffered from organic and functional diseases; second generation, 90 children, of whom 62 per cent. suffered from organic and functional diseases; third generation, 82 children, of whom 95 per cent. suffered from organic or functional diseases. In twenty-five families of heavy-drinking parents, 122 children were afflicted as follows: 7 had tuberculosis, 8 diseases of the heart, 31 functional diseases of the nervous system, 41 were drinkers, 6 degenerates and 4 were idiots. Only five of the entire number were normal. These figures speak for themselves. They deserve serious attention.

So much for heredity. The drink environment proves itself quite as conspicuous an etiological factor in the disabilities of school children. Of those suffering from organic diseases, at least a third live in an unhealthy and squalid environment, in an atmosphere of drunkenness and immorality—during the day beaten and cursed, and at night permitted to sleep on the floor. Thousands fill premature graves and other thousands with enfeebled constitutions labor through life under the curse inflicted thus on them. The condition of the children of the "submerged tenth" is pitiable. Few normal children are to be found among them. Undoubtedly much of their disease is born in filth and nurtured by vice, but no inconsiderable portion finds its genesis in the bottle. These children have little to curb the animal passions, but every opportunity for the expansion of depraved natures. The drink environment is such a menace to growing girls that virtue is maintained with difficulty. It is believed that at least half are likely candidates for lives of prostitution. Girls seven, eight and nine years of age have been outraged, and there are certain houses which appear to make a specialty of this business.

Why are these things allowed? Are there not charity organizations, children's aid societies and boards of health to supplement an elaborate and costly police department? Yes, but the conditions which we would correct are so intimately related to the legalized liquor traffic that any move to protect the child is met with a counter move to protect the income of the political grafter and to throw a halo of sanctity about the denizens of the saloon. Dangers will grow less as protecting agencies grow stronger.

ONE CAUSE OF INFANT MORTALITY

The importance of sanitary environment in its relation to the public health in general and to infant mortality in particular is once more emphasized by Dr. Thomas Devine, writing in a February number of the *Lancet*. The writer's immediate purpose is to establish the fact that insanitation is a factor in infant mortality, but, collectively taken, his observations not only serve to prove the point at issue, but form as well an argument for improvement of conditions as worthy of attention upon this side of the Atlantic as in England. We briefly summarize his argument as follows: (1) Infant mortality is lower in country than in city. (2) A considerable portion of infants are hand-fed. This opens up the way, so to speak, for the play of insanitary conditions through the influence of food. Fatal diarrhea in hand-fed children is, on this account, probably proportionate to the degree of insanitation to which the child is exposed. Infant diarrhea is twice as fatal in towns as in the country. (3) Measles is a very fatal disease among young infants, especially among those living under insanitary conditions. Deficient ventilation tends to a fatal issue, and is therefore much more fatal in towns than in country. Whooping-cough is less influenced by the same conditions and hence its fatality in towns is less marked. (4) An infant brought up in the dark, damp congested areas of slums has little resistant power and must fall more readily a victim to disease. (5) The factor "over-crowding" includes many conditions which must be classed as insanitary, as pollution of air, water, soil, etc., and over-crowding has been proved to conduce to a high infant mortality rate.

ABSTRACTS

Joint Diseases of Children.—De F. Willard (N. Y. Medical Journal, June 1906). This excellent review of the subject may be summarized as follows: 1. Early diagnosis is the most important of all considerations. Physicians are responsible for a large majority of joint destructions, chiefly from carelessness or indifference in the examination of their patients. A child with any peculiarity of gait or carriage should be examined naked. 2. Every physician should abandon the thought that pain in a single joint in a child means rheumatism. A limp or peculiar gait with rigidity of periarticular muscle in a child always means some form of invasion, probably tuberculous, possibly septic. 3. An effort should be made to abort tuberculous infection by immediate absolute rest and fixation of the joint. 4. The patient should be kept out of doors, day and night, for a long period of time. 5. Wise conservatism consists in the prompt application of all methods of relief, whether hygienic, mechanical, or surgical. In children conservatism should be the rule, since youth has remarkable recuperative power. In adults, however, operative measures are much more frequently demanded. A limb that can readily be saved in a child, in the adult will demand amputation. If an operation will best accomplish a cure, such operation is true conservatism. 6. In septic cases following streptococcic, staphylococcic, pneumococcic, or gonococcic infection, the joint should be opened early and freely.

Late Rickets.—Schmorl (Deutsches Arch. f. klin. Med., October, 1905). The bendings and deformities of the bones observed during the later years of growth independently of rickets occurring in childhood, have been regarded as either osteomalacic (von Recklinghausen) or ricketty (Mikulicz) in character. There is a great want of definite evidence to confirm either of these views.

The author gives four cases of late rickets, observed by himself, in detail. He is unable to be certain that they are not cases of infantile rickets relapsing later, but thinks this improbable. Two were females aged 18 and 21, two males, 19 and 9; they died from various acute infections, and he examined their skeletons both macro- and microscopically. The bones in general were little bent or distorted; but the bony tissue was abnormally soft, and the endochondral ossification at the anterior ends of the ribs was proceeding irregularly, over an unduly large area, and with absence or defect of the preparatory calcification zone at the edge of the cartilage capping the bone; the zone of proliferation here was also abnormally vescular. The lesions were, in fact, identical with those seen in infantile rickets. And in all the bones of late rickets examined, Schmoral found small scattered areas of non-calcified osteoid tissue throughout the calcified bony tissue. Hence rachitis tarda, like rachitis infantum, is a disease of the whole osseous system. Schmorl also argues that his four cases are not early examples of rachitis tarda, because, though the rib cartilages showed comparatively little change, this osteoid tissue was present in large amount. He says that the question whether late rickets is a ricketty or an osteomalacic phenomenon is indifferent, now that one can no longer uphold the old distinction between the two, which stated that the osteoid tissue in rachitic bones was newly-formed uncalcified bone, while that in osteomalacia was decalcified bone tissue (halisteresis). The important distinction between rachitis and osteomalacia is this, that the endochondral ossification is disordered in the former, but remains normal in the latter. Schmorl notes that Morpurgo has produced an epidemic of what he calls osteomalacia in white rats; other rats infected with this are said to have exhibited osteomalacia if adult, rachitis if newly-born.

A Case of Barlow's Disease.—Cattaneo (La Pediatria, October, 1906). The author presents a detailed description of an interesting case of this disease. The patient was a male child of two years. He was brought complaining of difficulty in micturition, feverishness, diarrhœa, with fœtid stools. The child was in a state of evident malnutrition. He was pale, and presented certain features of progressive rachitis. The head was bossy; the fontanelle still open; the chest was laterally compressed, while the abdomen was large and tumid. There was no history of cough or of vomiting, and none of convulsions. An examination of the urine showed it to be rich in uric acid. The temperature while the child was in hospital varied somewhat, but immediately settled when the patient was put upon a diet of milk, coffee, and bread. The administration of urotropine produced improvement in the condition of the urine, so that small calculi which had previously been passed ceased to appear. Massage of the abdomen was ordered, and this still further improved the patient's condition. A mixture of iron and calcium was administered. After this certain of his joints began to swell up, and when an exploratory incision was made blood was found to be present. The gums then became swollen and spongy and muco-purulent rhinitis set in. A rigid diet of milk with a small amount of lemon-juice was then prescribed. The swelling of the joints soon after began to diminish, and the temperature, which had once more begun to rise, again resumed the normal level. The gums became less spongy, and the bowels were more regular. The diet of milk with fruit was continued, and the child left the hospital in capital condition.

It is interesting to note that this case presented signs of anæmia and cachexia, with concomitant rise of temperature, a scorbutic condition of the gums, sharp pains in some of the joints, and swelling of certain of the articulations. The diagnosis at first might have wavered between articular rheumatism, infantile paralysis, rachitic pseudoparesis, and syphilitic disease. Only one diagnosis, however, was possible—namely, that of Barlow's disease. According to the classical description, this disease is one of infancy, and is characterized by a progressive anæmic condition, slight febril exacerbations, sharp pains especially aggravated on movement and handling of the patient. There are also swelling of and hæmorrhages in the lower limbs with subperiosteal hæmorrhages. When the patient has cut some teeth, then the gums are found to be hæmorrhagic. On an antiscorbutic diet rapid improvement takes place in such cases.

Relation of Weight to the Measurements of Children during the First Year.—Heischner (Archives of Pediatrics, Oct., 1906). Conclusions are as follows:

1. The height and circumference of head, chest, and abdomen in normal, well-nourished children increases as the weight, the greatest increase in the measurments occurring during the first quarter of the year, when the greatest gain in the weight occurs. The next greatest increase in the measurements takes place, coincident with the gain in weight, during the second quarter; while the last increase in the measurements occurs in that part of the year when this gain in weight is least, the third quarter of the year.

2. The height and the circumference of head and chest in fairly well-nourished children likewise increase primarily as the weight, although in this class of patients age plays a more important part than in the well-nourished. The greatest increase in measurement occurs in the first quarter of the year, with a similar gain in weight. The increase in the height and circumference of the head is slightly greater in the third than in the second quarter, although the gain in weight during these periods is the same, showing that age, irrespective of weight, has a very slight bearing on the growth of the body; while the smallest gain in the weight and growth is in the last quarter of the year.

3. It is in the poorly-nourished children that age plays the most prominent part, and the measurements of these children, compared with the well-nourished, increase most rapidly in the last quarter of the year.

4. In the poorly-nourished children, when the weight is below normal, all the measurements are correspondingly below normal. The height and circumference of the head reach the normal

birth measurements a little ahead of the weight, while the chest and abdomen are two months later in reaching the measurements of a normal child at birth.

5. When the weight is stationary, the increase in the measurements is very small, depending upon the slight influence which age has upon the growth of the infant notwithstanding the weight.

6. The measurements of infants of the same weight, notwithstanding the age, are very similar. The small difference depends, as when the weight is stationary, upon the very slight influence of age upon growth.

7. During the first year of life the primary factor in the increase of the measurements of the body is a steady, consistent increase in the weight, the influence of age being secondary and of much less importance in this connection.

Study of Spread of an Epidemic of Measles.—(Gazetta degli Ospedali, June, 1906). The day after the first case of measles was observed, all the schools were closed down, but, notwithstanding, in a few days nearly every child in the district presented symptoms of measles. The invasion was like a cloudburst, and 600 cases were reported before the epidemic finally died out six months later. Koplik's spots were noticed in about half the cases, sometimes six or seven days before the eruption appeared. A map of the tract affected shows that the epidemic proceeded along a comparatively narrow, almost straight line from southwest to northeast. Part of the way is along a river and part along the main highway, but both river and highway diverge from the line of the epidemic, and other adjoining or interposed districts through which the river or highway pass did not present a single case. The conditions of this epidemic suggest that the germs were spread by way of the wind. The sudden invasion and the continuance of the epidemic along the path of the prevailing winds, in a mountainous country, with the entire escape of districts in shut-in valleys, harmonize with this conception of air-borne contagion. In 2 cases tuberculous meningitis developed afterwards, in others conjunctivitis, and other serious after-affections were observed in many instances. Measles alone does not seem to be a very serious affection, but danger comes when it is complicated with infection from other germs. The difference between the mild and the severe cases of measles is so great that mere variation in the virulence of the measles' germ is inadequate to explain it. A severe course must be due to associated infection. Treatment should aim to improve the hygienic condition and to keep away all possible infection from other scources.

Partial Human Milk Feeding.—F. P. Denny (Journ. A. M. A., December 8). The author contributes his experience in dealing with the problem of artificial feeding, by a description of the method used in the Massachusetts Infant Asylum, where for some years it has been the custom to employ a few wet nurses to nurse the children suffering from infantile marasmic disorders alternating with their own children. It has been made probable, he says, by recent investigations that the superiority of mother's milk depends largely on substances which are of the nature of ferments, and the benefits derived from its use do not necessarily depend on the amount given, but may be expected from very small amounts. He reviews the literature of the subject and argues that the benefit from this method of partial human milk feeding is due to a certain extent to the increased bactericidal property of the blood, and while there is a good deal that is obscure in the mode of action, there is enough to justify a working hypothesis, and the experience in the institution mentioned bears this out. Atrophic infants and those suffering from some infection often show prompt improvement from such alternate nursing, even though not enough has been taken to rob the wet nurse's own child, which Denny thinks is never justifiable. Of course the condition and health of the wet nurse, as well as of the infant, must be carefully considered. It is not claimed that small amounts will accomplish what larger ones would, but only that much good can be done in this way. Good results are obtained by the addition to the infant's diet of from 2 to 5 ounces of human milk a day, and it is unjustifiable, he thinks, to keep babies in the hospitals unless sufficient amount of breast milk is added to their diet to make them resistant to hospital infections.

Polioencephalitis after Scarlet Fever.—S. PASTORE (Giornale Internazionale delle Scienze Medichi, Feb., 1906). A girl, aged 6, during an epidemic of scarlet fever, was suddenly attacked with chills, headache, debility, high fever, and angina. The tongue had the peculiar raspberry aspect; the glands of the neck swelled, and a typical rash appeared. During convalescence, 4 weeks after the onset of the illness, she became aphasic. There was paresis of the facial nerve and of the left arm and leg. The aphasia and facial paresis disappeared in some days, but the arm and leg were more severely damaged. After 5 months the leg was slightly atrophied, the arm was more atrophied, its muscles were contracted, and it was about 2 in. shorter than the right and presented athethosic movements.

Primary Tuberculosis of the Vulva in a Child.—HAMBURGER (Wien. med. Woch., February, 1906). A female child, 3 years of age, was found to be subject to bilateral inflammation of the inguinal glands with little pain. In hospital the source of the glandular inflammation was traced to an irregular ulcer of the labia minora in the region of the commissure. It was irregular, and suppurated but little. Diphtheria, gonorrhea, and chancroid were excluded, and the Bacillus tuberculosis was found in great quantity in the discharge from the sore. The after-history confirmed the diagnosis of primary tuberculosis of the vulva. Chronic suppuration of the inguinal glands followed, then scrofulous cachexia, phlyctenular ophthalmia, suppurative otitis, eczema of the ears, and general glandular enlargements. The lungs were never involved, and the child's health rapidly improved when she was sent to the country. The vulvar ulcer healed, leaving a scarcely perceptible cicatrix.

Appendicitis in Children.—J. H. HESS (Archives of Pediatrics.) The author enlarges upon the difficulty of diagnosing this disease, due to the difficulty of examination, to crying, restlessness and general rigidity and inability of the very young to relate their symptoms. General or local peritonitis may be the first sign; pain and hyperesthesia when associated with vomiting and constipation are often symptoms sufficient for diagnosis. There may be "belly-ache" and the curled up lateral decubitus. The pain may be referred to the right testicle or to the region of the bladder; it may at first be localized at McBurney's point, and may soon become diffuse, radiating from the umbilicus to the pelvis. In rare instances perforation may precede pain. Tenderness on pressure is of little value. Rigidity of the right rectus is present early, but is difficult to make out because of the general abdominal rigidity on examination in the very young. Nausea and vomiting soon follow the onset of the pain; chill is rare. The pulse corresponds with the temperature, becoming rapid, weak, soft and irregular with peritonitis. The temperature is not to be relied upon; there may be little fever in very bad cases; there will be a distinct fall after perforation and with the onset of peritonitis. Constipation is the rule; diarrhea is occasional and indicates a less urgent type. Tympanitis develops late. There may be flexion of the thigh and a tendency to put the hand to the region of the appendix. There is frequent micturition. Rectal examination may in older children localize the point of greatest pain; and in later stages abscess. After a few days a lump may be felt in the iliac fossa. The leucocyte count is less valuable than in adults, for in children it may normally reach 20,000 or more. In making a diagnosis one must bear in mind colic, indigestion, intussusception, acute intestinal obstruction, Pott's disease, renal or biliary colic, perityphlitic or perinephritic abscess, pneumonia and pleurisy, tuberculous peritonitis, incipient inguinal hernia, typhoid fever and undescended testicle. Cases have been reported at six weeks of age.

Infantile Syphilis.—Edward F. Cushing (Amer. Journ. of Dermatol., April, 1906). Owing to the very great mortality of syphilitic infants, a surprisingly small number of cases of hereditary syphilis is seen in either dermatological or pediatric clinics. Of 4,830 children treated consecutively at the King's College Hospital, only 29 were cases of undoubted syphilis.

If at birth a child shows evidences of syphilis, such as a small, wizened appearance, feeble cry, bullous eruption, etc., it has a very slight chance of living. Probably the earliest manifestation of hereditary syphilis in a child that is born apparently healthy, is the syphilitic coryza. It appears usually in the first month. A pronounced case, showing purulent discharge, blood crusts in the nares, sores about the mouth, and nares and loud snuffling breathing, is characteristic. Though the naso-pharynx remains free from syphilis in the early stages, about 10 per cent. of the cases show laryngitis, causing either hoarseness or inaudible voice.

The commonest rash observed in infantile syphilis is the maculo-papular, appearing often in the third or fourth week. The rash is often confined to the buttocks, genital region and thighs, the region covered by the napkin. Fissures and excoriations about the anus are frequent. The skin of the palms may be thickened, glossy and desquamating in flakes. On the forehead, cheeks and about the mouth may be seen maculopapules and fissures. The veins of the scalp may be dilated and varicose. The nails are often poorly developed, thickened and curved, or paronychia may be present.

Of the discoverable visceral lesions, enlargement of the liver and spleen are most important for diagnosis. Syphilitic nephritis may be present and give rise to a considerable amount of albumin and casts. Syphilitis orchitis is fairly common, the testicles being hard, two or three times the normal size and not tender.

Lymphatic enlargements are not specially diagnostic as in acquired syphilis. Finally bone lesions, changes at the epiphyses, which may be detected by the X-rays, and pseudoparalyses must be considered as diagnostic aids in cases of infantile syphilis.

Stenosis of Pylorus in Infants.—J. B. Fisk (Annals of Surgery, July, 1906). The author reports on a series of 71 cases of hypertrophic stenosis of the pylorus in infants operated on. Of these, 38 recovered and 33 died, giving 53.53 per cent. recoveries and 46.47 per cent. mortality. Gastroenterostomy was performed 42 times; 24 patients recovered and 18 died, a mortality of 42.56 per cent. Pyloroplasty was performed 11 times, with 6 recoveries and 5 deaths, a mortality of 45.46 per cent. Of the fatal cases, one patient survived the operation five weeks, and another ten weeks. Figuring on the latter basis, the mortality would be only 27.28 per cent. Eighteen patients were operated on by divulsion, with 9 recoveries and 9 deaths. One of the patients who recovered had to have a secondary gastroenterostomy performed three weeks later. If this case was considered as a failure, as it certainly would have been, the mortality is 55.55 per cent. There was one case of pylorectomy in which the patient died. Fisk says that gastroenterostomy appears to be the operation of choice, either the anterior or the posterior method. In infants the operation should be done by suturing the parts together. It is Fisk's opinion that preference should be given in selected cases to pyloroplasty, as it is physiologically, anatomically, and surgically the more correct procedure. Early diagnosis and early operation, before the infant has had an opportunity to lose much weight, or has become greatly emaciated and enfeebled so that its reparative power is greatly reduced or lost, is more essential to a successful outcome of surgical treatment than the method of operation, other things being equal.

Multiple Neuritis following Measles.—E. Revilliod and E. Long (Archives de Méd. des Enfants, Mar., 1906). A healthy boy, aged 8 on April 21, developed an eruption resembling measles, but without other symptoms. In 2 members of the family previously attacked the symptoms resembled those of scarlet fever, of which there was no suspicion in this case. On April 23 the rash had disappeared and he felt well, but on the 25th he had headache and slight conjunctivitis. On May 2 he returned to school, but was weak on his legs, and fell twice while at play. Next day he had difficulty in going upstairs and complained of cramps and vague pains in his limbs. On May 6 medical advice was again sought. He walked with difficulty and his gait was unsteady. He could not go up or down stairs, climb into bed, or raise himself from a lying to a sitting posture. The upper limbs were weak, the knee-jerks were absent, and the plantar reflexes were diminished. He had suffered from headache in the morning. On May 9 the paralytic symptoms had increased, the patient being scarcely able to stand or sit erect without support. The upper limbs could be moved in all directions, but the muscles of the neck, shoulder, and upper arm were weaker than those of the forearm and hand. There was no resistance from the deltoid in bringing the arm to the side, or to passive flexion or extension of the forearm. The hands were less affected, and he was able to write, but with some difficulty. The movements of the lower limbs were much impaired, and when the foot was raised from the bed the toes dropped, though this could be corrected by an effort, and the toes could be moved freely. The muscles of the trunk were weakened, and the patient, when rising from the floor, executed similar movements to those employed by the subjects of pseudo-hypertrophic paralysis. The deep reflexes at the knee, elbow, and wrist, were abolished, but the cremasteric and abdominal reflexes were present. The sphincters were not affected. There was no tenderness along the course of the nerves, or impairment of sensation, but diplopia was present from paralysis of the external rectus of the right eye, so that, in reading or writing, one eye was covered.

In the absence of tenderness of the nerve trunks, the occurrence of a sub-acute anterior poliomyelitis was considered possible, and massage and nux vomica were prescribed. On May 13 the patient complained of pains in the course of the nerves, which were also tender. There was no appreciable atrophy of the muscles. On May 18 the muscles of the limbs had improved, but the patient could not walk or sit up without support, the sensibility of the skin had increased, the nerves were less tender, and the diplopia had disappeared. The improvement continued, and on June 8 there was no reaction of degeneration, but the electric reactions of the muscles were diminished. By the end of June he could walk some distance, but was easily fatigued, and the tendon reflexes were still absent. Not till November did the deep reflexes become normal, and the patient's health became perfectly restored.

A Case of Intussusception in a Child of Six Months; Operation; Recovery.—Alfred Hand, Jr. (Archives of Pediatrics, June, 1906). The patient, a breast-fed male infant, six months old, had been seen to fall forward suddenly, as though he had received an unseen blow; this was followed immediately by vomiting and a movement of the bowels. A dose of castor-oil was given, but the vomiting continued and the movements were bloody. On examination by the author the child presented the classic appearance of acute intussusception —the eyes sunken and rolled up, showing the conjunctivæ, the abdominal lines of the face marked, giving the peritoneal facies; the abdominal walls relaxed and allowing the sausage-like tumor to be palpated easily in the line of the descending colon; the stools typically free from fecal matter and consisting only of blood-stained mucus. Rectal examination was confirmatory, and, awaiting the arrival of the surgeon, 15 drops of paregoric were given.

To the touch the constriction seemed to be too great to be overcome by hydrostatic pressure from below, but at the surgeon's request Dr. Hand administered an injection of water from a fountain syringe elevated two feet above the body, kneading the mass gently at the same time. After a fair trial this was unsuccessful, and preparations were made for a laparotomy. Only nitrous oxid was used throughout the operation. The incision was in the middle line, and the reduction of the intussusception was not an easy task. It was accomplished more by manipulation of the mass, causing expulsion, than by traction on the small intestine.

Just after the operation had been started a hypodermic injection was given, containing 1-100 grain of morphin and 1-2,000 grain of atropin, and from the start of the anesthetic to the completion of bandaging, thirty-five minutes elapsed, the child's condition when put to bed being: Temperature 103.6 degrees F., pulse 188, respiration 52. By the next evening the temperature was 99 degrees F., pulse 136, respiration 24, and the further course of the case was quite uneventful, the daily range of temperature being from 98 degrees to 100 degrees F. The bowel movements numbered two or three a day, being composed of greenish mucus, but with the administration of bismuth salicylate their character became normal and the number lessened to one, or occasionally two, daily. For the first day after operation, barley-water was given in dram doses, then increased to 2 ounces hourly, with the addition of 5 drops of liquid peptonoids. In a few days equal parts of whey and barley-water were well tolerated, and shortly afterwards breast-feeding was resumed. The stitches were removed on the eleventh day and the child was discharged in a healthy condition nineteen days after admission.

In conclusion, the author emphasizes two points. First, his belief that, having made preparation for laparotomy, it is wise to attempt reduction by enema, but if unsuccessful to operate at once. Second, the need of giving a dose of opium at once, as soon as the diagnosis is made. In acute intussusception there is no such tendency, as exists in the chronic form to a certain degree, for the bowel to release itself from its own grasp, but the constriction becomes tighter and tighter, unless opium comes in with its calming influence. It is conceivable that in the few hours usually elapsing under the most favorable circumstances between the diagnosis and operation the effect of opium, in relaxing the already existing spasm or only in preventing a greater degree, might spell the difference between a successful and an unsuccessful outcome.

Rheumatic Manifestations in Children.—M. H. LICARD (Med. Record, May 5, 1906). The author calls attention to atypical symptoms. The abrupt involvement which polyorthritis and endocarditis characteristic of adults is often replaced in children by chorea, tonsilitis, erythemas, subcutaneous nodules and endocarditis, which frequently overshadow the joint involvement. The juvenile arthralgias in rheumatism seldom presents the evidence of inflammation as in the adult; though there is moderate pain on motion. There is tenderness in the periarticular structures. The attacks last a few days or weeks and then subside; but show a tendency to recur. Rheumatism is seldom manifest under the second year; and very rarely before the first year. In most cases at two years and over the onset is gradual; the temperature not high—usually not above 102 degrees. The pain and malaise are moderate; there is a slight puffiness or swelling; the joints most often affected being the knee, ankle, elbow or wrist, or the small joints of the foot and hand. Sometimes but one joint is involved; sometimes there is severe restlessness and pain, but without characteristic rheumatic swelling. Some cases are without fever and the pain is so slight that the child is not put to bed; these mild attacks may be overlooked. The temperature may be irregular and suggestive of influenza or malaria; here a minute examination may reveal a sensitive tendon or muscle. It may be that an endocarditis, a chorea or a persistent anemia will be the first intimation of the rheumatism. Pericarditis as a complication is more important from a prognostic standpoint; but it is less frequent than endocardial disease. Pleurisy may superveue. Subcutaneous nodules may appear, being attacked by pedicles to tendon sheaths, ligaments, or the periosteum; they are found most frequently about the elbow joint, tendon sheaths of the forearm and hand, the clavicle, the sternomastoid, the skull, the patella, the vertebral spine and the crest of the ilium. They are usually pea-sized and may occur in groups of as many as fifty. They are made up of fibrous tissue and may undergo degeneration and disappear within a few weeks or months. Erythema nodosum is the most frequent variety of erythema; the nodes are situated mostly along the tibial regions and the extensor surfaces of the forearm. They are red, raised, inflamed, and very tender; their long axes are parallel to the limb. They have ecchymoses upon fading. Tonsilitis and pharyngitis are closely associated with articular rheumatism; and anemia, when present, is severe. In every case of persistent anemia we should think of rheumatism.

Hemorrhage in the Newborn.—H. MCCLANAHAN (Journ. A. M. A., Oct. 13, 1906). The author reports on a series of six cases of hemorrhage occurring spontaneously in the newborn, with histories; several cases of traumatic hemorrhage are also briefly reported. One of the spontaneous cases was a fatal hemorrhage from the lungs, which apparently is rather rare. He gives the principal facts in regard to hemorrhage of the newborn, its occurrence within the first few days after birth, its serious character in most forms, its apparent lack of any relation to hemophilia and the obscurity of its etiology. He thinks that it is probably due to some unknown specific cause producing a change in the blood vessels. In hemorrhages occurring later than the first ten days of life, he considers septic infection as the most likely factor. His experience, apparently, does not afford any special support to the theory of hereditary syphilis in these cases, though it is considered an important predisposing cause.

Symptoms of Scurvy Simulated in Typhoid Fever.—S. Auverney (Riforma Medica, Oct. 20, 1906). A girl, aged 15, was suddenly attacked on June 15, with high fever (104 deg.) and headache. On the following days the temperature did not exceed 100.4 deg. On the 29th hæmorrhagic spots appeared all over the body and the temperature rose to 104 deg., but rapidly fell to 100.6 deg. and remained low on the following days. On July 9 there was abundant epistaxis, the pulse was 140, the respirations were 40, the spleen was slightly enlarged, there was a little albumin in the urine, the diazo reaction was negative, and the gums were swollen and bleeding. The red corpuscles numbered 3,015,000 and some were nucleated, the white corpuscles numbered 10,800, and the hæmoglobin amounted to 30 per cent. Typhoid bacilli were found in the blood. After some days epistaxis recurred and then vaginal and vesical hemorrhages followed. Adrenalin chloride was injected, but death took place. The necropsy showed cutaneous and subpleural hemorrhages, slightly enlarged spleen and ulcerated Peyer's patches. The spleen yielded cultures of the typhoid bacillus.

Appendicitis or Pneumonia.—Broca (Paris Medical Journal, Dec., 1906) Cases that prove to be medical are sometimes submitted to the surgeon for treatment and even for diagnosis as the author shows in the present article. A boy of ten was admitted in the morning as an urgent case, suffering from acute appendicitis. He had been seized at midnight, with vomiting and pain in the abdomen. The general condition was certainly serious for there was dyspnoea, with coated tongue, dry lips and gums and a temperature of over 105 deg. And yet there was room for doubt as regards the diagnosis. The abdominal pain was to the left and slight and the whole abdomen was supple and freely palpable. The pulse, 128, was full and regular. On auscultation, a pure tubular *souffle* of pneumonic consolidation was heard. Such cases are evidently occasional sources of grave error and form a strong argument against those who desire to operate in appendicitis in the first twenty-four hours.

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ORIGINAL ARTICLES

SOME RECENT OBSERVATIONS ON DISEASES OF CHILDREN.*

A REVIEW.

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Much has been written on the importance of using a sufficiently high proportion of fat in the feeding of infants, and there is no doubt about the evils which result where fat is deficient but the opposite fault, excess of fat, has attracted but little notice. Holt (*Archives of Pediatrics*, Jan., 1905) draws attention to the serious disturbance of nutrition which may result from the use of food-mixtures containing too high a proportion of fat. A percentage of 5.7 instead of 3.4 per cent. may appear to suit the infant for a time, but is likely, sooner or later, to cause trouble; he quotes the case of an infant who was having 6 per cent. of fat in a mixture of top-milk and water; there had been rapid progress in weight and development until the age of eight months, when he weighed 21 pounds. Then convulsions occurred, followed by laryngismus stridulus and tetany, and the child was ill for three months with wasting.

He mentions other cases, in which infants, taking milk-mixtures which contained 6-7 per cent. of fat, developed convulsions, and notes that, in one case, chronic constipation and rickets were also present, while in another the constipation was only overcome when the fat was reduced from 7 per cent. to 3 per cent. It is particularly noteworthy that in these cases the rise in weight may be rapid and steady for several months before the evil effects of the high fat percentage become apparent, and the disturbance produced may be quite gradual in its development; for instance, the appetite may gradually fail, so that for weeks the child will take hardly a third of his former food, and the weight ceases to rise, or may slowly and steadily fail, until the excess of fat in the food is stopped. The fault has risen sometimes from the idea that, by increasing the proportion of fat, chronic constipation may be overcome. The facts show that constipation may be aggravated by excess of fat in the food; sometimes the rich milk of Jersey cows, or top-milk, has been used without regard to the percentage of fat which they contain. As Dr. Holt says, to have any clear idea of the correctness of this or that food for an infant, the doctor "must learn to think in percentages." Northrup (*ibid.*) made some observations which confirmed Holt's experience. He attempted to substitute for cod-liver oil, in the treatment of rickets, a super-fatted milk. The result of the high fat-percentage was constipation with hard dry fæces, and, at the same time, some vomiting from gastric irritation. The rarity of such results from cod-liver oil suggests that the toleration of fat depends, not merely upon the proportion, but also upon the kind of fat used. But it seems clear that even the fat of human milk may, when excessive, act as deleteriously as that of cow's milk. Northrup (*Archives of Pediatr.*, Dec., 1905), records a case in which an infant, being breast-fed by its mother, began to suffer from colic, frothy stools, and wasting. The mother had been taking little exercise, drinking a quart of milk daily, and forcing herself to eat much food in order to continue suckling. Her milk was found to contain 8.9 per cent. of fat, and although by care in dieting and some open-air exercise the fat was reduced to 4.9 per cent., the infant improved only gradually, after milk had been omitted altogether for several days, and had then been introduced only in extreme dilution.

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*Practitioner.

That there are considerable differences between the fat of human milk and that of cow's milk is certain. Stern (*Archives of Pediatr.*, June, 1905) points out that the proportion of volatile fatty acids in cow's milk is nearly six times as large as that present in human milk, and, even physically, there are well-marked differences; for instance, the fat in human milk is in much finer emulsion than that in cow's milk, and so is easier of diet absorption. Determination of the fat in the fæces of infants has shown that much more of the fat in human milk is absorbed than of that in cow's milk. Stern advocates the use the yolk of hen's eggs to supply the fat necessary in infants feeding, where there is difficulty in digesting milk fat. Yolk fat is well borne by infants, while the residue of yolk fat, passed in the fæces, is less than that of any other animal fat. The yolk must be given raw, and a quarter of a teaspoonful at a feed may be sufficient. According to Stern, the yolk contains 48.2 per cent. of fat, and the amount required daily is to be calculated on this basis; milk fat is to be excluded altogether, or nearly altogether, from the diet in the meantime by using only skimmed milk.

INFANTILE DIARRHOEA

The etiology of diarrhea in infancy has been the subject of speculation and investigation for many years, and individual observers have concluded, from their own researches, that this or that micro-organism was the chief factor; but seldom, or never, has such an ideal example of scientific co-operation been presented, as in the recent study of diarrheal diseases of infancy reported from the Rockefeller Institute for Medical Research. In a series of twenty-four papers, some dealing with the bacteriological and some with the clinical aspects of infantile diarrhea, the rôle of the bacillus dysenteriæ (Shiga), in this connection, is thoroughly investigated by a body of workers, the results of whose observations are co-ordinated, and summarized by Flexner and Holt. The bacillus dysenteriæ was found in the mucus of the stools, or in the intestinal mucosa in fatal cases, in 63.2 per cent. of the cases examined. It was very rarely found in fæcal matter, but almost always where there was mucus or blood in the stools. The blood of infants, suffering from diarrhea, sometimes shows marked power of agglutinating the bacillus of dysentery, a point which seems to favor the view that this bacillus bears a causal relation to the diarrhea. An examination of the stools of 30 healthy children, under four years of age, did not show this bacillus in any case; scrapings from the mucous membrane of the intestine in 24 infants, who died of disease other than intestinal, showed the bacillus only in three, and, in each of these three, the colon was found to be in a catarrhal condition at autopsy, and the stools in two of them had contained mucus before death. Flexner, whilst admitting the posibility that the bacillus dysenteriæ may prove to be one of the occasional, or regular, bacteria of the normal intestine, and that it may acquire its pathogenic properties only under certain conditions, points out that there is some evidence of contagiousness in the diarrhea of children, as in the bacillary dysentery of adults, and that therefore, as a practical precaution, the danger of entrance from without of specially pathogenic examples of the micro-organism is not to be disregarded.

It is noteworthy that, with the cultures of the bacillus dysenteriæ, there were often associated growths of streptococci in large numbers, and it may be that these play some part in the production of the diarrhea.

The clinical records of the cases, in which the bacillus dysenteriæ was demonstrated, show certain points of interest: and perhaps the most striking is the great variation in the severity of the disease. Some cases could only be classed as the mildest form of intestinal indigestion, some were severe and acute cases of diarrhea, such as are labelled clinically acute ileocolitis. Many of the infants had been exclusively breast-fed; in one series of cases, 20 per cent. had been kept at the breast; the number of stools per diem was not more than 3 to 5 in some cases, while in others it was 12 to 15; in some cases, the whole disturbance lasted only a few days, in others, the illness lasted several weeks; some were acutely ill, some were in a condition of chronic marasmus, with unhealthy, but not always very frequent, stools.

The morbid anatomy of the fatal cases also showed nothing constant, or characteristic. In many cases there was only "slight congestion" of the mucous membrane of the small or large intestine, in some, there was enlargement of solitary follicles, or Peyer's patches, in a few, some superficial erosion, follicular or otherwise; only very rarely was there found that intense inflammatory change, which results in the formation of membrane-like patches on the mucous membrane of the intestine. None of the observers were able to trace the bacillary infection to any particular source; but cow's milk, at any rate, may be exonerated in those cases where breast-feeding had been used exclusively. Holt suggests that the infection may be waterborne, but of this there is no proof. It was noted that, in rare instances, small ward epidemics occurred; but it seems improbable that there is any great risk of contagion, although undoubtedly the occasional spread of infection, apparently by the excreta, suggests the importance of preventing contamination of food, or water, by persons handling the child's napkins.

The treatment, suggested by the bacteriological findings, is serum injection, and, for this purpose, an anti-dysenteric serum was used in 83 cases; 38 of these died; only 12 showed any noteworthy improvement following upon its administration. Holt, however, does not consider that the serum has yet had adequate trial. He points out that, in subacute infections, or in cases with much marasmus, the symptoms relate much more to the functional disturbance of digestion than to the specific toxemia of the dysentery bacillus.

The serum treatment is adapted rather to the sharp acute attacks in infants, or older children with some powers of resistance, where the real problem is to combat the infection rather than to maintain nutrition. The several observers, whose reports deal with cases treated by serum injection, are almost unanimous in their opinion that it had no curative value; in a few cases only did some improvement follow its use, and in these, the reporters, with wise scientific reserve, express no dogmatic opinion as to the improvement being due to the serum. In some of the reports, it is specially stated that the serum had no ill effects; but in one it is mentioned that the injections "seemed to cause great pain," and whether the pain is great or little, this must always remain an objection to such methods of treatment, especially for children, and a good reason for abandoning them, unless there is very clear evidence that their therapeutic value is sufficient to warrant the infliction of pain.

DISEASES OF THE THYROID GLANDS IN CHILDREN

The rarity of affections of the thyroid glands in children, has, no doubt, led to the recording recently of several instances of disease in this gland. Congenital absence of the thyroid is familar enough now, as the usual cause of cretinism, but occasionally the gland is affected in children apart from cretinism. Several cases have been recorded of exophthalmic goitre in children. In one recorded by Lawson (*Trans. Soc. Dis. of Children,* Vol. IV.), the patient, a girl, aged 12 years, showed first prominence of the eyes, and six months later, enlargement of the thyroid; but several cases, at a younger age, have been recorded. Wautski (*Med. Wochenschr.,* 1901) reported the case of a boy, aged five years, who had suffered for three months from exophthalmos, and enlargement of the thyroid glands, his pulse was 120, and he showed Moebius' sign (defective convergence of the eyes), and some inco-ordination of his arms, when they were extended. An even younger patient was reported by Variot (*Gaz. des Mal. Infant.*, Vol. IV., No. 3), a boy, aged 4½ years, after an attack of whooping-cough with broncho-pneumonia, developed exophthalmos and goitre, with marked tachycardia (pulse 152-168), anæmia, and attacks of diarrhœa. He improved much in two months.

Enlargement of the thyroid is sometimes seen without other symptoms, and may be a congenital condition. From some observations, made by Perrands (quoted in *Archives of Pediatr.,* 1902, p. 917) it would seem that congenital syphilis may cause marked changes in this gland in the newborn, and may determine a great enlargement from formation of fibro-cellular elements. Coulon (*Archives. de Med. des Enfant,* 1904, p. 36) reports a case which seems to confirm these observations. An infant, born of syphilitic parents, was found at birth to have enlargement of the thyroid; there was no other evidence of syphilis in the child, but the known fact of its parentage suggested the administration of mercury, under which the thyroid enlargement entirely disappeared. A remarkable association has been noted between the administration of potassium chlorate to the pregnant mother, and the occurrence of enlarged thyroid in the infant at birth. Fothergill (*Journ. of Obstetr.,* Jan. 1904) records a fifth instance of this association. A woman, aged 37, had been given potassium chlorate, during pregnancy, to prevent abortion. During the last few weeks of pregnancy, she had also taken tabloids of thyroid. The infant, a female, died a few minutes after birth, from the presence of a large thyroid tumor, which, on examination, showed general hypertrophy of the thyroid. The gland was seventeen times the normal size.

A case of cystic enlargement of the thyroid at birth has been recorded (*Canad. Lancet,* March, 1905) in a female infant, who died at the age of nine days, after several attacks of dyspnœa, apparently from the interference with respiration which was caused by the tumor in the neck. The thyroid was found to be indurated, and full of cysts containing clear fluid.

Acute inflammation of the thyroid gland, in a child of three years, who was recovering from erythema nodosum, was recorded many years ago by Barlow (*Clin. Soc. Trans.*, Vol. XXI.). In that case, the temperature was raised to 101 deg.-102 deg., and the enlargement of the gland, with which at first there was pain in the neck, lasted about a fortnight. It has been stated that an acute inflammatory enlargement of the thyroid gland is sometimes associated with acute rheumatism. Money (quoted by Barlow) observed such an acute swelling in a girl if 12 years, who had had acute rheumatism, but as menstruation had begun two weeks before the swelling of the thyroid occurred, it seems possible that the swelling may have been related to the onset of menses rather than to the rheumatism. The association with acute rheumatism had been recorded also by Molière of Lyons in 1873, and recently Clemens (*Archives of Pediatr.*, Oct., 1905) states that, in a series of 13 consecutive cases of parenchymatous goitre in children (12 of whom were girls, and all at ages varying from 8 to 12 years), rheumatism was present in all, and in 3 there was advanced chronic endocarditis. In all the rheumatism appeared to have preceded the enlargement of the thyroid.

Acute inflammation of the thyroid gland, ending in suppuration, occurred on the 15th day after vaccination, in a child of 2 years (*Rev. de Clin. Pediatr.*, Vol. I., p. 599) ; the condition was found to be due to a streptococcal infection. But, in some cases, no cause can be found. Carpenter (*Trans. Soc. Diseas. Childr.*, Vol. III.) observed an acute enlargement of the thyroid, ending in suppuration, in an infant aged 14 months, without obvious cause, and refers to a case in a girl, aged 11 years (*Pediatr.*, 1900, p. 508), in whom the acute swelling, which was associated with fever, hoarseness, and difficulty of breathing, came without apparent cause, and disappeared without suppuration in 8 days.

HEMORRHAGES IN THE NEW-BORN

Hemorrhage within a few days after birth has long been recognized as one of the most dangerous affections of this period, but, although the occurrence is no great rarity its explanation is still obscure. It is easy enough to understand why hemorrhages in the meninges, suprarenals, or other viscera, should occur in the still-born, or in infants dying within a few hours after difficult labor, and, as Spencer showed (*Obstet. Trans.*, XXXIII., 256), a large proportion of such infants show internal hemorrhage in various parts; but the cases, in which an infant, within a few days after birth, begins to bleed profusely from the stomach, or bowels, or navel, or other external part, are by no means easy to explain. It seems likely that some are the result of a septicemia, but it may be doubted whether it is wise to assume that the symptoms which have been described as melena neonatorum, Winckel's disease, hemorrhagic disease of the new-born, &c., are all to be referred to one cause, namely, "infections of the new-born," as Hamill and Nicholson have proposed (*Archives of Pediatr.*, 1903). They record 6 cases, all fatal within 19 days after birth, and all showing, on examination of the blood taken after death, micro-organisms, which may have accounted for the symptoms. In 2 of these cases, hemorrhage had been a marked clinical feature; in 1 there was constant bleeding from the mucous membrane of the mouth, together with some bleeding from the bowels; in the other there was oozing of blood from the matrix of the nails in the fingers, beginning on the 5th day, with jaundice, and followed by severe hemorrhage from the mouth, vagina, rectum, and umbilicus, and death at the age of 7 days. In the former case, the blood yielded staphylococcus pyogenes aureus, and bacillus aërogenes lactis; in the latter, the blood showed only staphylococcus aureus. In neither case was syphilis stated to be present.

That syphilis is at least a contributory factor has been the opinion of many observers. In a series of twelve cases of spontaneous hemorrhage in the new-born, two at least were attributable to congenital syphilis (*Journ. Amer. Med. Assoc.*, Jan., 1903), and Mracek found endarteritis of the small blood vessels in the submucosa of the alimentary tract, in cases of hemorrhage in syphilitic infants. Wilson (*Archives of Pediatr.*, Jan., 1905) reports 10 cases, in which hemorrhage in still-born infants, or in infants dying shortly after birth, was associated with definite evidence of syphilis in the child, or in its parents, and considers that the finding of various micro-organisms in the blood after death may point merely to a terminal invasion of the blood, and be in fact, an epiphenomenon of no importance, in the etiology of the hemorrhage condition, or, at any rate, not incompatible with a syphilitic basis of the hemorrhagic disease. The actual cause of the bleeding, he suggests, may be degenerative changes in the blood and vessels due to syphilis.

There are, however, cases on record which suggest that no such general infection, syphilitic or otherwise, is necessary to produce some of the most severe hemorrhages in the cases of melena neonatorum; for example, Morris and Feldman (*B.M.J.*, Feb., 1905) report a case, in which an infant, 19 hours old, began to vomit blood, about a tablespoonful every hour. The hemorrhage was apparently provoked by feeding, and subsided on treatment, adapted to the supposition that a gastric ulcer was present. This lesion has been found in several cases, and in others, *e.g.*, in one reported by T. D. Lister (*Path. Soc. Trans.*, Vol. L.), a small ulcer was found in the duodenum just below the pylorus.

These cases of melena, or hematemesis, in the new-born, although always extremely dangerous, are not necessarily fatal, and, of recent years, several cases have been recorded showing the value of the suprarenal extract in this condition. Adrenalin solution (1 in 1,000) has been used in doses varying from 1 to 5 drops, repeated at short intervals. Townsend (*Boston Med. and Surg. Journ.*, 1905) records a case in which gelatin, dissolved in water, was given by the mouth, while adrenalin solution was applied to the navel, which was bleeding profusely Both the gastro-intestinal hemorrhage and the umbilical bleeding stopped, and the infant made a good recovery. Holt recorded a case in which saccharated extract of suprarenal, one grain suspended in water, given every four hours, stopped the gastro-intestinal hemorrhage after 12 hours. Calcium chloride, in doses of half a gram every two hours, has been recommended as reducing the hemorrhage tendency.

CONGENITAL LARYNGEAL STRIDOR

The vexed question as to the mode of production of the stridor in these cases has again been raised by a recent contribution from Koplik (*Archives of Pediatr.*, Dec., 1905), who made a post-mortem examination of the larynx in a case which had died of broncho-pneumonia. The child, a male, was aged one year at the time of death. The respiration had been noticed to be noisy, and accompanied by a crowing noise, both with expiration and with inspiration, from the age of three weeks. This had become more marked at the age of 5 months, and had persisted ever since. Any attempt to look into the fauces was always followed by a stoppage of respiration and a loud inspiratory crow, like that of laryngismus stridulus. During the broncho-pneumonia the child had several convulsions, but was not rickety. The upper opening of the larynx is described as follows:—"The epiglottis was curved backwards, and lay over the superior opening of the larynx. The lateral borders of the epiglottis were in contact, leaving a slit, which varied from half a millimeter in its greatest extent from the top of the epiglottis to a millimeter and a half at the arytænoid cartilages, where the space between the aryepiglottic folds was a little wider than above. The aryepiglottic folds were almost in contact, and were thin and membranous." The larynx showed nothing else abnormal, except that it was found impossible to introduce the smallest size one-year intubation tube between the cords without great force; so that it was concluded that this aperture was narrower than normal. The thymus was large, and weighed 25 grams.

The description given corresponds closely with that reported by Dr. D. B. Lees (*Path. Soc. Trans.*, 1883), and both observers consider the anatomical condition to be sufficient explanation of the croaking respiration.

Thomson and Turner (*Brit. Med. Journ.*, Dec. 1, 1900), however, whilst agreeing as to the anatomical peculiarity of the upper opening of the larynx in these cases, regard it as an acquired deformity, not a congenital malformation. They found that, by introducing a tube into the trachea after death, and exerting forcible suction from below, in imitation of forced inspiration, they produced alterations in the form of the upper aperture of the larynx, almost exactly resembling those found at autopsies on infants who had died of congenital laryngeal stridor. Repetition of the experiment soon produced some enduring alteration of the same kind. Thomson and Turner concluded, therefore, that the peculiarity found, in these cases, was merely an exaggeration of the normal infantile type, and was due mainly, if not entirely, to a constantly recurring sucking-in of the upper aperture of the soft larynx, and this sucking-in they attributed to "the ill-co-ordinated and spasmodic nature of the breathing." The anatomical condition was, in fact, an acquired deformity, analogous to a pigeon breast. Koplik objects to this view on the ground that the anatomical finding is ample to account for the stridor, without any supposition of nervous inco-ordination, and that the peculiar conformation at the upper opening of the larynx is found too early to be an acquired condition, for instance in a case recorded by Refslund, which was examined at the age of 2½ months.

Massei (*Arch. Inter. de Laryng.*, 1905) also has recently expressed his opinion that, although the stridor is to some extent dependent upon nervous influence, it is dependent primarily upon a congenital malformation of the upper aperture of the larynx. It is difficult to understand how anyone, familiar with these cases of "congenital laryngeal stridor," could attribute them to pressure of an enlarged thymus, and it is satisfactory to note that Koplik considers the size of the thymus, in this case as in no way connected with the obstructed breathing. Nothing but confusion is likely to arise out of the term "congenital thymic stridor." Hochsinger (*Rev. Mens. des Mal. de l' Enfance,* Mar., 1905) states that, out of 58 nursing infants examined with the X-rays, 26 showed hypertrophy of the thymus, and 20 out of these 26 showed congenital stridor, and he considers that the peculiar noise heard with respiration shortly after birth, and loudest at the end of inspiration, and without alteration of voice, is due almost exclusively to pressure of an enlarged thymus on the trachea. Obviously, such statements can only refer to some condition quite distinct from that to which Koplik and Lees were referring, and a condition which is so rare that it may be doubted whether any one observer has seen 20 cases; moreover, if hypertrophy of the thymus is to be found in nearly 50 per cent. of nursing infants, as Hochsinger apparently finds, there might well be even more scepticism as to its rôle in the production of symptoms than at present; but until there is more agreement as to what degree of enlargement, as found at autopsy, constitutes "hypertrophy of the thymus," it would be rash to accept the very doubtful evidence of X-rays as proving any such enlargement. It seems possible that, in very exceptional cases, enlargement of the thymus might conceivably cause some undue pressure on the trachea, but when it is considered how soft and yielding the thymus is, and how comparitively firm and resistant the trachea is, even in an infant, and, moreover, how rarely enlarged caseous glands, and even sarcomata in the mediastinum, produce any tracheal or even bronchial obstruction, it seems at least unlikely that the thymus should cause any tracheal obstruction by direct pressure; and it is quite certain that not only does the thymus vary within very wide limits of size and weight, without any evidence whatever of its interfering with the child's health in any kind of way, but that when it happens to be of a weight near the maximum limit of this variation, and within those limits which some would describe nowadays as "hypertrophy of the thymus," there has not been the least interference with respiration. Cases, however, are on record in which it is supposed that some such obstruction occurred. Jacobi (*Archives of Pediatr.*, March, 1903, p. 181) referred to a case (Koenig's) in which symptoms of suffocation existed, and the thymus was drawn out of its position somewhat, and part of it removed, and the infant recovered. The exact nature of the symptoms is not stated, so that the bearing of this case upon the subject of congenital stridor is uncertain. A recent instance of congenital stridor, in which operative measures were tried on the assumption that the symptoms were due to enlarged thymus (Morse, *Arch. Pediat.*, Dec., 1905, p. 888), seems rather to prove that, in that particular case, at any rate, these symptoms were not due to the thymus; for, although dyspnea at first ceased when the thymus was pulled up, it recurred a few days later in spite of operative fixation of the thymus in the position which at first relieved. But even if the thymus is to be held responsible, in very rare cases, for some obstruction to breathing, it seems probable that, as Thomson and Turner point out, the symptoms, therefrom, being those of tracheal obstruction, will be found to be different from those of the "congenital laryngeal stridor," if the view is correct that, in these cases, the croaking noise is produced in the larynx.

SANITATION IN SCHOOLS.*

BY PROFFESOR OLIN H. LANDRETH,

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In approaching this subject, I am at a loss to determine which impresses me most, the critical importance of the matter of proper sanitation in its bearing on both physical and mental development or the richness of the present opportunity to affect both home and school through these assembled sanitary officers, each of whom is in position to exert a peculiar and widespread influence. I can only wish that what I have to say may in some small measure correspond in value to both topic and occasion.

The subject and the assemblage do not admit of an arbitrary treatment; sanitation is no longer empirical, but has acquired a scientific basis, and it would poorly harmonize with the intelligence of New York State Health officials to discuss the matter in hand in any other than a fundamental, rational manner.

Before advancing, let me frankly assure you that I have nothing startling and little that is new to offer. I am not here as an investigator, to offer the fruits of my own researches, but rather as a plain worker to emphasize the need of more systematic effort in putting into effect the established principles of sanitation as they bear on school conditions and training.

Any intelligent, rational treatment of the subject must of necessity be based on a clear understanding of the modern conception of health and disease, and especially the true nature of the latter.

Health may be defined as that condition of the body and its organs which conduces to an efficient and extended life. The human being, like all other living organisms, finds itself at all times exposed to the influences of two general classes of agencies and conditions—namely, those which are favorable and those which are unfavorable to health. It is the function of *hygiene* to develop and promote the former, and of *sanitation* to minimize the latter.

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*Read before the New York State Health Officer's conference, Albany, N. Y.

A perfect human mechanism would be one whose every organ was so carefully and perfectly adjusted in strength and durability to the life task imposed on it that each should perform its function unimpaired to the last and fail only in unison with all its coordinate members. But such organisms are rare.

Prof. William T. Sedgwick, in his excellent work on the "Principles of Sanitary Science and Public Health," states that 45,108 deaths were reported as having occurred in the State of Massachusetts during the year 1890. Of these:

Disease caused	92 per cent.
Violence, accidents and drowning caused	4 per cent.
Old age caused	4 per cent.
Sum total	100 per cent.

In our own State of New York, for the five years ending January 1, 1903, the average number of deaths per annum has been 123,554. Of these, the reports of health officers show that:

90.2 per cent. were caused by disease;

5.4 per cent, were caused by violence, accidents and drowning; and 4.4 per cent. were due to old age.

Total 100 per cent.

These statistics indicate that, in Massachusetts and New York at least, only one death in twenty-five is attributed to old age, and that more than nine out of every ten persons die from disease.

These statistics do not, however, fully represent the influence of old age, since many deaths which are directly caused by disease and are so attributed would not have occurred at all or would not have ended fatally but for the declining vigor and diminished resistance due to advancing years. In other words, disease in these cases was not the sole nor necessarily the principal cause of death, but rather its immediate or incidental cause. While death in these cases would not have occurred but for the diminished powers, death also would have been deferred had disease not been present as an incidental cause. Disease rather than old age may, therefore, still be considered as playing a major part as a cause of death.

The foregoing statistics also show how far we are from the ideal of human physical efficiency. Oliver Wendell Holmes' "Deacon's Masterpiece" has long been the engineer's ideal model in constructive design; the acme of the economic distribution of material and strength in inanimate structures; but Prof. Sedgwick also appropriately applies the parable to the human body.

He comments and quotes as follows:

"Death is the final stoppage of the living mechanism; but while theoretically this comes only when all parts are worn out and as the simple, natural cessation of function from sheer and general debility of each and every organ, it does not, in fact, come very often in this way. The machine breaks down; it does not wear out. Some organ or part gives out comparatively early, and by failure to do its part destroys the whole.

"Facts like these may or may not have inspired the author of the 'One Hoss Shay' who, in his famous poem has described the building of the body; its defects of constitution and construction; the ordinary cause of its death; and finally the theoretic possibility of so making a living body that it shall die at last because it is worn out, namely, from old age. In the person of the Deacon, the Autocrat, himself a physiologist, has consciously or unconsciously stated the case as follows:

" 'Now in building of chaises, I tell you what,
There is always somewhere a weakest spot,—
In hub, tire, fellœ, in spring or thill,
In panel, or crossbar, or floor, or sill,
In screw, bolt, thoroughbrace,—lurking still,
Find it somewhere you must and will,—
Above or below, or within or without,—
And that's the reason, beyond a doubt,
A chaise *breaks down,* but doesn't *wear out.*'
"His remedy for this unfortunate state of things was,—
" 'Is only jest
T' make that place uz strong uz the rest.'

"Accordingly the Deacon proceeds to build his masterpiece in such a way that,—

" '. . . the wheels were just as strong as the thills,
And the floor was just as strong as the sills,
And the panels just as strong as the floor,
And the whippletree neither less nor more,
And the back-crossbar as strong as the fore,
And spring and axel and hub *encore.*'

"With the result that after a whole century of life, though there were indeed

" '. . . traces of age in the one-hoss-shay,
A general flavor of mild decay,'
" 'But nothing local, as one may say!'
"And when the end came from sheer old age,—
" '. . . It went to pieces all at once,—
All at once, and nothing first,—
Just as bubbles do when they burst.'

"Such is old age: the low burning flame which flickers and finally goes out; the ripened fruit which drops heavily to earth; old mechanism, which after long years of service refuses to work, finally because it is worn out."

This is our ideal. How may we attain it? Through hygiene and sanitation employed continually, but primarily and particularly during childhood. We cannot make a carriage fine and durable after it is built. It was in the building and not in the use that the "One Hoss Shay" received those admirable qualities which made it the "Deacon's Masterpiece." Neither can we make an efficient human individual by deferring consideration of his physical welfare until after he has reached mature life. The physical qualities which make the human mechanism a masterpiece must also, as in the building of a chaise, be imparted during the period of development. It has been said by some of the more ardent advocates of the doctrine of heredity that the period of development and training of a child begins a hundred years before it birth. If this be true, we should not be discouraged by fear of having commenced too late, but rather encouraged by the far-reaching influence, even to future generations, of present efforts and activities.

Where *one* result is attainable in making a carriage perfect, *two* may be accomplished in developing an efficient human mechanism. However perfect a masterpiece the Deacon's carriage may have been, its capacity did not extend to a conception of the principles of good carriage-making, and it was clearly incapable of taking care of itself, both of which the intelligent, properly trained human individual can do. There are hence two distinct classes of results to be derived from school sanitation which may be classified under the heads of *execution* and *instruction*.

The former would include the creating and maintaining of proper sanitary conditions and safeguards about the school; the latter would cover proper instruction in the fundamentals of hygiene and sanitation as a part of the child's life equipment with which to combat disease and give old age a chance.

What may we say of executive sanitation?

During the period of school age children are peculiarly susceptible to many forms of communicable diseases, and they are also readily affected by unfavorable predisposing influences; they may thus become the medium of dissemination of communicable diseases throughout their district, and their constitutional vigor and resistance to disease may be impaired even where no specific disease is contracted. It is, therefore, of the highest importance not only that this free dissemination of communicable diseases, which school intercourse offers, should be interrupted and prevented as much as possible by vigilant school inspection, isolation and disinfection, but also that the physical conditions which surround both children and teachers at school should be kept hygienically favorable.

The available agencies to effect these results are in the main as follows:

1. State regulation of the design and construction of all school buildings, which would bring about proper structural conditions of floor-space per capita, ventilation, lighting, water-supply, sewerage fire-protection and fire-escape, and the selection of proper materials and finish for wall surfaces, ceilings and floors to insure the best sanitary conditions and render possible and easy the thorough disinfection and fumigation which should be a required feature in the sanitary maintenance of the building.

2. A systematic, frequent inspection of all school buildings by municipal health officers, looking toward the maintenance at all times of sanitary conditions in and about the buildings.

3. A system of frequent and thorough disinfection and fumigation of school buildings in conjunction with thorough and prolonged airing during the night time and while the buildings are vacant.

4. An extension to all schools of the system of daily medical inspection of pupils which has proven so successful in many city schools, the inspectors being under the direction of, and reporting to, the municipal health officer. To minimize the labor

and cost of this medical inspection as well as to develop the teachers' knowledge and responsibility for the physical welfare of pupils, each teacher should be intrusted with the preliminary observation and inspection of all pupils on their first appearance at school each day, and they should refer to the medical inspector, when he calls, each case which appears to require medical inspection. It is hardly necessary to say that this requires a certain measure of very desirable training and preparation on the part of the teacher, the possession of which should be determined as carefully as the other qualifications. The scheme of medical inspection should also include a systematic examination of each pupil by the medical examiner at stated periods not less frequent than once a year, and preferably two or three times each year. The results of these examinations should be communicated to the parents or guardians with recommendations as to needed treatment if any, and this should also be done in the case of the daily inspections whenever treatment or more exhaustive examinations by the family physician or specialist are thought necessary.

It will be observed that the second and fourth of the above-suggested agencies, and doubtless also the first and third, place added duties and responsibilities upon the local health officer. It is fully appreciated that the present duties of this officer, certainly in the more populous municipalities, are onerous in consideration of the meagre compensation generally paid him; but it is also plainly evident that the new services proposed, which naturally and properly belong to this officer, are of the highest importance and offer promising returns in the enhancement and conservation of public health, and that the natural and proper solution of whatever difficulty may be experienced in making these services of the health officer available is to require more of the health officer's time and adequately to compensate him therefor. It is almost inevitable that such increase of time and pay of this important public official, not only for this proposed service but others, must follow if public sanitation is to keep pace with sanitary knowledge. The result of this constantly increasing demand on the health officer is sure to be reached in the not-distant future in the absorption of his entire time and services, requiring that he abandon altogether the practice of medicine, and if competent men are to be retained the paying of adequate salaries commensurate with the income of the practising physician. One incidental result of great importance will also doubtless be that if the health officer is to give, his entire time and energies to his official work it will permit, if not necessitate, a specialization and preparation for his work which will greatly enhance his efficiency, and that these features will lead to greater permanence in office, which also will tend toward greater efficiency of service.

Passing to the second division of the topic, viz., sanitary instruction, it is evident that the school offers not only the earliest, but also the best opportunity to disseminate, through the children to the general public, a fundamental conception of the rudiments of public health, sanitation and hygiene, and an understanding of the nature, means of transmission and methods of prevention of the various communicable diseases. On the ground of public safety alone this general knowledge on the part of the public is an essential. Departments and boards of health, sanitary laws and measures will be of but little value unless the general public, for whose benefit they are established, are informed both as to the fundamental principles of their action and also as to their importance. This necessity is recognized by the New York State law providing for compulsory instruction in the public school during six weeks of each year in physiology, and fortunately this study forms an important adjunct if not a necessary basis of the proposed sanitary instruction. The nature of the instruction and the means for giving it, while important, are not inflexible, and may be adapted to suit the existing conditions. It may even be informal and claim no material amount of time from other school subjects, and need form no tax on the mental burden of pupils if the instruction is properly arranged and presented. Oral instruction carefully prepared and systematically presented by teachers properly trained in both the principles and pedagogics of the subject, and appropriately illustrated by every-day, familiar examples and applications, may easily be made more effective and less burdensome to the pupils than formal text-book work and recitations. The executive school sanitation outlined in the first division of this paper, if properly explained in principle and application by the teacher, would in itself form admirable and available illustrative material.

This instruction, particularly if given informally and without text-books, presupposes a fairly thorough understanding of the subject and, therefore, preparatory training by the teacher. Is it too much to ask that the normal school of the State shall extend even the good work that is done in these topics in certain schools so as to equip all teachers with even a more extensive and available form of knowledge of the principles and the procedure of sanitation and hygiene and also in the science of teaching it?

One State at least, Michigan, has for several years had on its statute books a law making the teaching of the rudiments of sanitation and the means of transmission and prevention of communicable diseases compulsory in all the pulic schools of the State. The same law requires the State Board of Health to furnish annually to the public school superintendents and teachers throughout the State, printed matter which shall form the basis of such instruction. Our own State Commissioner of Health, Dr. Lewis, assures me that he will gladly co-operate with the Department of Education, if so desired, by furnishing, in the form of bulletins or otherwise, similar material for instruction purposes in New York State.

These suggestions are thrown out for consideration, not only by the health officers of the State here assembled, but also by the Department of Public Instruction, which I am glad to see is represented here to-day by Hon. D. E. Ainsworth, Deputy Superintendent of Public Instruction, the co-operation of which department toward any effort along the lines suggested would of course be essential to success and appropriate to the topic.

The Michigan law above referred to is hereto appended for your examination.

MICHIGAN STATE LAW

Providing for the Giving of Elementary Sanitary Instruction in Public Schools.

Michigan Public Acts, 1895. Chapter 146.

An Act to Provide for Teaching in the Public Schools the Modes by which the dangerous communicable diseases are spread, and the Best Methods for the Restriction and Prevention of such Diseases.

Sec. 1. The People of the State of Michigan enact that there shall be taught in every year in every public school in Michigan the principal modes by which each of the dangerous communicable diseases are spread, and the best methods for the restriction and prevention of each of such diseases. The State Board of Health shall annually send to the public school superintendents and teachers throughout the State printed data and statements which shall enable them to comply with this act. School boards are hereby required to direct such superintendents and teachers to give oral and blackboard instructions, using the data and statements supplied by the State Board of Health.

SEC. 2. Neglect or refusal on the part of any superintendent or teacher to comply with the provisions of this law shall be considered a sufficient cause for dismissal from the school by the school board. Any school board wilfully, neglecting or refusing to comply with any of the provisions of this act, shall be subject to fine the same as for neglect of any other duty pertaining to their office. This act shall apply to all schools in the State, including schools in cities or villages whether incorporated under special charter or under the general laws.

Approved May 16, 1895.

THE TREATMENT OF CHRONIC VALVULAR DISEASE IN CHILDREN.*

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There is no specific or well defined line of treatment for chronic valvular diseases in children. Only general principles governing the treatment in this condition can be laid down, the successful application of which to particular cases must depend on the skill and experience of the physician.

This disease, as it occurs in children and adults, presents certain points of difference. In children, when not a congenital condition, it occurs almost always as a sequel of acute endorcarditis caused by acute rheumatism or one of the infectious diseases; while in adults, as a result of changes in the valvular tissues produced by atheroma, by gout, syphilis, lead or alcohol, or by long continued muscular overexertion, a considerable proportion of cases appear as chronic from the start. Another fact which differentiates this condition in children from the same condition in adults is that the growth and development, which puts a burden on the crippled heart of the child from which the heart of the adult is free. These points of difference have a bearing on the treatment.

In the treatment of this disease it is of prime importance to individualize each case. In the treatment of all diseases correct practice demands that each case be individualized, but there are some diseases whose course is sufficiently regular to make it possible to describe a routine treatment for the average typical case. This is not so, however, in chronic valvular disease. Here we find no typical average case. The patient may appear to be in perfect health, or he may present a complication of serious disorders, in the treatment of which the utmost skill in the adjustment of remedies is required. In individualizing a case of chronic valvular disease in a child, besides making as accurate a diagnosis as possible of the particular valve lesion, and estimating carefully the condition of the heart muscle as regards nutrition and functional power, we must also take into account the idiosyncrasies of the patient and his physical and mental environment.

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*Read before the Pediatric Section of the Kings County Medical Society, Oct. 24, 1906.

Success in the treatment of this disease depends largely on the general management. Here we often encounter difficulty. The patient is a child and irresponsible, so his co-operation cannot be secured. He cannot be trusted to do what he is told, but must be compelled to do it. It is the parents on whom we must depend to enforce our directions for general management. It is easy to get the effective co-operation of the parents when the child is suffering, but when he is free from troublesome symptoms and chafes at the restrictions imposed it is not always easy. It is a good plan early in the case to explain frankly and fully to the parents the nature of the disease, what prospects there are of improvement under good management, and what dangers threaten the patient if the prescribed directions for general management are not rigidly carried out. It may be necessary to refer to this subject many times, to harp on the dangers, and to emphasize the responsibility which rests on those who have immediate charge of the patient. Even then the parents frequently fail to enforce prescribed restrictions, being influenced by the pleadings of the child. The prognosis in this disease is worse than it would otherwise be, because of the difficulty so often experienced of securing proper management during and after convalescence. In every case the physician should insist on having the child brought to him for observation at least four times a year, no matter how well he may be.

The most important part of the management of these cases often consists in keeping the patient in bed for a long time. This is a remedial measure of the greatest value. In every case where compensation has been lost the patient should be kept in bed until long after compensation has been reestablished. This is treatment enough in mild cases, and in severe ones no treatment is of avail without it. How long a particular patient should be kept in bed is not always easy to decide. It is better to keep a child in bed too long than to let him get up too soon. Several months in bed does a child no harm, and is not too great a price to pay for a reasonable security against relapse. It is somewhat different with adults, whose retention in bed requires to be regulated more closely. A good rule is to keep a child who has suffered from ruptured compensation, or who recently had acute endocarditis or an acute exacerbation of chronic endocarditis, in bed for at least a month after all symptoms that in any way show disturbance of the circulatory balance have entirely disappeared. This is the minimum. More often it is advisable to keep him there longer. In view of the difficulty of controlling the parents during the period of convalescence, it is best to avoid setting a formal date for the child to get up, because if that is done the parents are very apt to anticipate it; and if circumstances should arise which compel us to postpone it, the difficulty of keeping the child in bed longer will be greatly increased.

After compensation has been established and the child is up and around, the amount and character of the exercise he takes must be regulated. While we should not risk a relapse by allowing too much freedom, on the other hand we should not restrict exercise so far as to cause the muscular system, including the heart muscle, to lose tone. In general, very little exercise should be allowed for a considerable time, perhaps a year, after restoration of ruptured compensation or recovery from acute endocarditis. Walking on the level is practically the limit in such circumstances. But after compensation has existed for a considerable time, and the heart muscle shows a fair amount of reserve power, greater latitude may be permitted. In favorable cases the patient may indulge in minor gymnastics, climbing hills, even bicycling on the level. But running, swimming and all athletic games in which there is prolonged muscular exertion must be absolutely prohibited.

Regulation of nervous activity in these cases is as necessary as regulation of muscular activity. The patient should be protected as much as possible from sources of nervous excitement. In this connection the question of school attendance comes up. I believe that it is safer to keep a child from school for at least a year after all signs of cardiac insufficiency have disappeared. When he does go he should be carefully watched for signs of heart strain, such as impaired nutrition or anemia, or more pronounced signs of imperfect compensation, such as shortness of breath on slight exertion and a dry cough. Particular vigilance is necessary at the time of puberty, when the burden of growth and development is heaviest, and when extra strain in school or at play easily destroys compensation.

In this disease the ultimate dependence is on the nutrition of the heart muscle, consequently the value of good hygiene and proper diet is obvious. The patient's room should be well ventilated, and when strong enough he should be in the open air as much as possible. If general nutrition lags, it may be advisable to try a change of scene and climate. The diet should be regulated with reference to the needs of the patient's system, the limitations of his digestive power, and the indications given by coexisting morbid conditions. Indigestion is common in uncompensated valvular disease, and greatly aggravates the bad heart action.

The use of heart stimulant drugs is often a vital part of the treatment of chronic valvular disease in children, but in order to get the best results they should be administered with care and judgment. Some of them are so very effective that it is easy to fall into routinism in their use, giving them in every case of valvular disease in which compensation is lost or weakened, and in more or less the same doses, and rapidly increasing the doses if the desired effect is not speedily obtained. Such injudicious drugging is frequently responsible for failure to produce good results. In giving these drugs to children the following consideration should be borne in mind:

First, they should not be given at all if the recumbent position alone is sufficient to restore the circulatory balance. It is only when compensation is so far lost that the recumbent posture alone will not restore it that they are indicated. If continued after compensation has been gained they may do harm.

Second, they should not be given to restore compensation without at the same time keeping the child absolutely in bed. Although it is true that adults, under certain circumstances, may be given heart stimulants to bring their circulation up to the level while they are allowed to be on their feet, such treatment is never justifiable in the case of children.

Third, they should be given in doses suited as nearly as possible to the capacity of the heart muscle. Because a certain dose of a heart stimulant fails to bring about the desired effect promptly, it does not follow that a larger dose will produce it. Often it happens that a larger dose will produce an injurious instead of a beneficial effect. If the heart is greatly dilated and its muscles correspondingly feeble, large doses of stimulants exhaust it. In bad cases it sometimes pays to try the effect of diminishing the doses of heart stimulants instead of increasing them. I have seen such action followed by good results. In order to get the greatest benefit from the use of heart stimulants when the heart is much dilated, small doses should be given at first, such as the weakened muscle is able to respond to. Later, when the muscle has gained in strength, larger and more effective doses may be given. In bad cases we should be satisfied at first if we can keep the patient's condition from getting worse. If it does not get worse it is probably getting better. In advanced cases of dilatation with much dropsy, visceral congestion, etc., improvement may be very slow. But if we have patience, and do not try to hurry too fast the development of the compensatory hypertrophy, we sometimes get suprising recoveries. If on the other hand we get impatient, and pour in heart stimulants in a frenzied attempt to make the heart do what is beyond its power, we may hasten the child's death.

The particular heart stimulant which should be used in a given case must be determined by the physician according to his experience, but there are a few guiding indications, such as the degree of heart failure, the extent of dilatation, and the character of the lesion. When there is considerable dilatation, digitalis is the classical remedy, but the superiority of this drug over all others in the treatment of dilatation is less striking in the case of children than in the case of adults. I have found strophanthus as effective or more so in a large proportion of cases. In cases of severity I usually give both drugs alternately, and have the mother or nurse report to me on the condition of the child while taking each. The report more often than not has been that the patient seemed better while taking the strophanthus. Even in mitral incompetency, where digitalis is generally supposed to be pre-eminently indicated, I have seen strophanthus produce equally good results. In bad cases of dilatation from any cause, strophanthus sometimes acts better than digitalis. In the treatment of the various stenoses, I think there can be little question of its superiority over digitalis. Possibly the explanation why the action of strophanthus is sometimes better than that of digitalis, lies in the fact that it exhausts the heart muscle less than does the latter drug. But strophanthus with all its good qualities, can not entirely replace digitalis as an agent for the steady training of the heart muscle. In the use of these drugs much depends on the method of administration as well as the reliability of the preparations.

Besides digitalis and strophanthus there is only one other heart stimulant which we are likely to need in the treatment of most cases of lost compensation. This is strychnine. Strychnine can be used in connection with the other two drugs oftentimes with great benefit, and it can be continued after they have been stopped, and even after compensation has been restored, because it does not have the bad effect on the compensated heart that they are apt to have. It is a valuable adjuvant heart stimulant, but can not be relied on by itself to restore compensation.

Besides the three heart stimulants above mentioned, there are many others which are in good use, but with the exception of aromatic spirits of ammonia and morphine, they need not be mentioned here. The others are inferior, and the only excuse we could have for using them would be that we could not get the better ones. The desire to use something different would not be a sufficient excuse. Aromatic spirits of ammonia is valuable as an emergency stimulant, and morphine is sometimes a life saving drug. When the dyspnea and cough are extreme and the patient is utterly unable to sleep, morphine or codeine is imperatively called for. But it should be remembered that children usually make more fuss with a given amount of discomfort than adults.

Besides the main treatment of this disease, which is directed toward establishing compensatory hypertrophy of the heart muscles, we are often called on to treat numerous complications which result from passive congestion. These complications range all the way from slight impairment of nutrition and anemia to cirrhosis of the liver and kidneys. Catarrh of the gastrointestinal tract, bronchitis and pneumonia are common. Dropsy is often present, though it is perhaps relatively less prominent as a symptom of valvular disease in children than in adults. The treatment of these complications is necessarily palliative so long as the cardiac insufficiency remains.

In closing this brief discussion of the principles governing the treatment of chronic valvular disease in children, I have ventured to give a few sketch reports of cases which illustrate the particular application of some of these principles.

Case I. Diagnosed as congenital pulmonary stenosis. Girl three years old, giving no previous history of significance except that when she was two years old a doctor said she had a "weak heart." Two weeks before I saw her she began to suffer from cough and dyspnea. When she came under my observation there was extensive pulmonary congestion, rapid and irregular heart action, and a temperature of 101 degrees. Over the entire chest a loud systolic murmur could be heard, which was most marked in the second left intercostal space near the sternum, where also a thrill could be felt. The murmur was transmitted to the left and slightly upwards. The treatment of this case consisted of rest in bed for three months, the administration of tincture of strophanthus in drop doses every four hours for one month, and a little iron. Compensation was completely recovered.

Case II. Diagnosed as mitral stenosis and incompetency due to acute rheumatism, with permanent relative tricuspid incompetency. Boy eight years old, with previous history of rheumatism and symptoms for two months past of ruptured compensation. When he first came under my care his lower extremities were greatly swollen. The area of his liver dulness extended two inches below the normal. His heart was enlarged both to the right and left. His pulse was small and feeble. There was a systolic murmur audible at the apex and all over the chest. At times a presytolic thrill could be made out at the apex. His urine was scanty, albuminous and bloody. There was distressing cough and dyspnea. Treatment consisted of rest in bed for five months, administration of four to ten drops of tincture of digitalis three times a day for four days, alternating with two to four drops of tincture of strophanthus every four hours for three days, and strychnine sulphate in doses of one hundred and eightieth to one hundred and twentieth of a grain three times a day continuously. Digitalis proved less effective in this case than strophanthus. Aromatic ammonia in five drop doses was occasionally given with benefit. During the worst period codeine in doses of one-sixteenth of a grain was of great assistance. There were times when the condition of the stomach required a diet of peptonized milk or of predigested foods. Iron was extensively given. Under this treatment apparently good compensation was secured which lasted six months. Then the child, whom it was impossible to keep under proper restraint, broke it down by playing too hard. In this relapse all the symptoms were worse than before except the dropsy, which was less. The dyspnea was so great that the patient was unable to lie down for five months. The lower lobes of both lungs were partly consolidated. The area of liver dulness extended four inches below the ribs. When compensation was with great difficulty again restored, there was a permanently dilated heart and a permanent relative tricuspid insufficiency. The enlargement of the heart was so great that the precordium bulged. The area of cardiac dulness extended from the right nipple line to the left mid-axillary line, and as far up as the second rib. At the present time, three months after the second recovery, the patient is beginning to show signs of failing compensation, and I expect that he will soon start on a final downward course.

Case III. Diagnosed as mitral incompetency following acute rheumatism, with relative tricuspid incompetency. Girl of six, supposed by her mother to have growing pains, shortly after became pale and languid, lost flesh, was short of breath, and had a troublesome cough. Examination showed a systolic murmur at the apex transmitted into the left axilla, with considerable enlargement of the heart. Rest in bed for five months, with administration of four to eight drops of tincture of digitalis three times a day for three or four days, alternating with tincture of strophanthus in doses of one to four drops every four hours for three or four days, with strychnine sulphate in doses of one hundred and eightieth of a grain three times a day, and a fair amount of iron from time to time, brought back good compensation. Six months later, despite the warning given to the mother, that she must keep the child constantly under her eye, the child was permitted to go with some other children on a long walk. This overexertion produced a rupture of compensation. This time it took eleven months in bed to restore compensation. A few months after the second restoration the child played too hard and a third relapse took place. The child improved for a time under treatment, but there was now a permanent relative tricuspid incompetency, and the improvement was transitory. Later she declined steadily, and died at the end of thirteen months.

Case IV. Diagnosed as aortic incompetency. Boy of fifteen, with history of frequent attacks of shortness of breath on slight exertion, and cough, during the past five or six years. When first seen by me there was extensive congestion of the lungs, a Corrigan pulse, and rapid and tumultuous heart action. The left ventricle was much enlarged, the apex beat being in the seventh interspace. There was a clear, blowing, diastolic murmur, audible with maximum intensity in the midsternal region and at the apex. Four drops of tincture of strophanthus were given every four hours, and a sixtieth of a grain of strychnine, and the parents were told to keep the boy absolutely in bed. This they failed to do for the first month, and during that time the patient tailed to improve. A severe lecture was then administered to the parents, after which the order to keep the boy in bed was obeyed. At the end of four months in bed fair compensation was recovered. Now he is walking around, gaining flesh, suffering no inconvenience. His apex beat is in the sixth interspace, and he has a marked cor bovinum.

PRINCIPLES OF MECHANICAL SUPPORT.*

BY C. D. NAPIER, M.D.

By mechanical support is meant artificial means in aiding nature to overcome a disease, injury or defect. This support is obtained by steel, plaster of paris, celluloid, leather, or wooden splints. It is indicated in diseases of the bones or joints, or fractures or dislocations, and in certain injuries, defects and malpositions. When the surgeon is called to assist healing by placing the part at rest or protecting it, he should understand thoroughly the general principles of mechanical support as well as those specially pertaining to the case in hand.

One of the cardinal principles of mechanical support is that it is an aid only and not the whole treatment. This is the most important principle, and yet the one least appreciated by many. It is flagrantly disregarded or not understood by the instrument and shoe makers who treat flattened arches of the feet solely with the insole, and disregarded as well by the physicians who think they have done their duty by such a patient when they send him to a brace maker for a plate. The causes which have produced this condition—improper shoes, faulty position of the foot in standing and walking—are not explained to the patient and corrected; and instruction in exercising and toning up the weakened and over-stretched muscles is neglected—all of which are just as important, if not more so, than the supports. And so also in dealing with the so-called "bete noir" of orthopedics—lateral curvature of the spine—the brace or plaster corset alone is not scientific, nor is the exercise treatment alone sufficient in all cases—as practiced by Bernad Roth, of London.

Heather Bigg, of England, has recently written on the use of the brace in lateral curvature, claiming that the exercise treatment and plaster of paris treatment are of no avail. He has probably either had no experience with those methods, or if he has tried them, has not properly adapted them to the individual case. The love of the brace has blinded him to the good in the others. The two should be intelligently combined where indicated. Were these patients brought under proper care early, this condition would not be considered so much of a "bete noir." Fractures are not neglected and therefore not dreaded. Even phthisis in its early stages is now looked upon with less fear. And the weak arch if seen in its incipiency and cared for with proper regard for its normal functions and position, may never require mechanical support; and we might be spared the difficult management of the neglected or anti-rheumatic treated, badly deformed flat foot. In those unfortunate cases of infantile paralysis, so much may be accomplished by muscle development, and later operative interference to correct deformity or by tendon transplantation or arthrodesis to give more stability and strength to a joint. Yet the brace is invaluable to aid the other methods.

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*Brooklyn Med. Jl.

It must be remembered that the artificial support, when applied, largely takes the place of nature's support—the muscles; and when muscles are not used, they become weakened. Where complete rest and fixation are not required for the cure of the disease or in the convalescent stage of Pott's disease or other joint diseases when constant fixation is no longer necessary, the muscles must be exercised in order that they may regain their tone and functioning power. That brace weakness always follows brace use is another principle which must be reckoned with.

In adjusting the steel, the pressure must be real where needed, but unnecessary pressure avoided, and good support obtained to the weakened part. The ordinary shoemaker's sole plate gives upward support only and does not take into account the sliding inward of the astragalus, and this may take place and marked valgus result while the foot is resting on this inefficient support. The commonly used short hip brace does not fix the diseased hip, if fixation is sought for. In the care of the fracture, the general rule is to fix the joint above and below with the plaster or splint, so in fixing a joint, the apparatus should extend well above and below the joint. A plaster dressing for fixation of the knee, when carried only to the middle of the thigh, as is so often the case, allows at least 10 per cent. of motion in the joint. Protection should be made in all directions. The common method applied with fracture of the neck or upper third of the femur—traction with a long side splint—does not take into account antero posterior motion. The daily application of the bed pan, usually by a semi-trained nurse, produces motion at the point which should be completely fixed in order to obtain union. Posterior support over the buttock is most important, either with the splint, or better, plaster of paris.

Prevention or correction of deformity is another important point to study and carefully work out in using any mechanical appliance. Whether treating Pott's disease, joint disease, lateral curvature, weak foot, paralysis, or fractures, it is known that deformity, that is, bad position, is almost sure to result if nature is not assisted in the right way. The anatomical condition and physiological functions of the part must be understood to appreciate what deformity it tends to, and then, by proper application of force in adjusting the appliance, that tendency must be counteracted. This problem may be a simple one or complex, owing to divergent action of muscles. The principles, however, are simple. In paralysis it is certain that, given a loss of power in one group of muscles, the opposing group tend to contraction and shortening, or if the affected group be merely weakened, the result is the same, but comes more slowly. It is an important point to recognize that muscles partly paralyzed, if allowed to be on the stretch, recover with difficulty, but if well supported and shortened up, regain their tone more quickly and more completely. An early case of infantile paralysis may often be much benefited by immediate application of steel or plaster of paris support. How many instrument makers can appreciate the value of these seemingly small points, or, if they do, can understandingly apply them to an individual case? Yet these mechanics are constantly treating such cases with their braces. The surgeon should study the case and be in control, the maker of the brace adjusting it under his direction.

The instrument maker should be what he is—a mechanic, not a surgeon. However, they do not hesitate to handle even a patient with Pott's disease. The writer has seen such a case which had been treated—or, more correctly, maltreated—by one of the best known and highest priced firms in New York, where, with the disease in the upper dorsal spine, a brace had been applied which held only the spine below, barely reaching up to the affected point. The parents, supposing the child was receiving proper care, allowed the case to go on, until extreme deformity resulted.

In diseased joints, or joints where the motion is restricted from any cause, the tendency is toward flexion, in the hip, flexion and adduction. Consequently the fixation or supporting splint should aim to preserve extension. Exception should be made with the elbow, where the flexed position is a more useful one in case of resulting ankylosis. When plaster of paris is applied to the ankle joint, whether for disease or fracture, the right angle position should be maintained that the tendo-Achillis may not be too shortened for easy walking, with also some inversion to prevent a subsequent valgus with resulting flat foot.

Nature must be made to aid us. The severely paralyzed child cannot walk, consequently the muscles which have some power are not stimulated by use to recover that power, and they become still more atrophied. Such a child well braced is put on its feet, is made extremely happy thereby, and muscular action is improved. The use of the crutch to take the place of a partly paralyzed leg is bad treatment. The leg which might become very useful if mechanically supported goes on to greater atrophy and greater shortening till it becomes a mere appendage.

The influence of growth on deformity is considerable. This is justly emphaized in Dr. Judson's excellent book on that subject. The limb should be carefully held in a normal position, that the bones may develop normally and not be subjected to abnormal pressure.

While treating one part, thought must be taken of the rest of the body. If one leg be shorter than the other the pelvis will be tilted and the spine thus curved. If his vicious position be maintained for some length of time, lateral curvature will likely result. In the application of the brace to hip disease, care must be observed that it does not become too short. In infantile paralysis one limb is usually shorter than the other. This should be equaled by building up the shoe. When the plaster jacket is applied not sufficiently low to include the whole abdomen, or the canvas apron of a Taylor spinal brace is too short, the abdominal contents will make too much pressure at the rings, with often a resulting hernia, which is favored also by the weakness of the abdominal muscles.

The material to be used in the appliance is often decided in favor of that with which the surgeon has had most experience. And so we will see Pott's disease, for example, treated largely by some with plaster of paris, and by others with a steel brace.

For thorough fixation the plaster is the more satisfactory; therefore, as a general rule, when there is active inflammation it relieves the symptoms quicker and the diseased process is better controlled than with any form of brace; but, as in everything else, the individual case must be studied. The assistance to be expected from the parent must also be considered. Where nothing but ignorance and carelessness or too much sympathy may be expected, one feels safer to lock up the joint or spine in plaster, rather than a brace which is easily removed.

To secure the best results a combination of different kinds of support is often essential. Hip disease may be well treated with fixation by means of a plaster spica in addition to a short hip brace, which acts as a crutch to take the weight off the joint. A paralyzed foot may be partially supported by a brace and partly by building up the shoe on the inner or outer side to prevent either a valgus or a varus. The knock-knee brace may be aided by raising the inner side of the shoe to take some of the strain from the ligaments on the inner side of the knee.

The older child or adult who is condemned to the use of the brace thinks much of its unsightliness. It should therefore be made as neat as possible, the steels approximating the limb as closely as allowable, and unnecessary steel avoided. Often an extra stocking with the foot cut off may be drawn over it, making it much less conspicious. The patient will then not be so tempted to discard an important support. A child can be taught to limp much less by securing a more nearly normal rhythm of step—a limp being merely a break in the normal rhythm.

These are merely suggestions relative to the general principles of support. They must of course, be applied rationally to the individual case. And it is a sensible proposition that the surgeon is the one to apply them, and that this duty should not be delegated to the maker of the steel, who has not the knowledge of the anatomy and functions of the various parts of the body to properly apply the principles.

SOME OF THE EVIL RESULTS OF MOUTH BREATHING.*

By R. J. Teague, Durham, N. C.

Mouth breathing is one of the most important subjects claiming the attention of the medical world to-day. One writer has recently said that one of the most interesting problems in medicine to-day is the prevention of the long list of ills and pathological conditions incident to mouth breathing in the young.

To thoroughly understand the evil results attendant upon mouth breathing we should not lose sight of the many causes producing it. The first and most important is enlarged adenoids; second, hypertrophic rhinitis; third, enlarged tonsils; fourth, bony growths of and deviations of the septum and polyps are causative factors in many cases. In the rush for the more formidable abdominal and other major operations the above named conditions are often lost sight of, or, if recognized, are not fully appreciated. Little importance is attached to them, and the unfortunate subject is left to himself and the protection which it is the duty of the physician to give is denied him.

Enlarged adenoids by pressing on the eustachian tubes may cause a long train of symptoms from ordinary catarrh of the tube to the most formidable cases of otitis media, purulent and septic meningitis.

One of the by no means uncommon complications is mastoiditis. Many patients are made partially deaf for life by repeated attacks of eustachian catarrh, which was looked upon as insignificant. Though the tubes and ears seemingly return to their normal conditions, yet changes are started in the mucous membrane lining the tube, middle and internal ears which interferes with the vibrations of the ossicles and functions of the tubes and ears in general.

This condition increases with each subsequent attack, and as a consequence we find after a limited time a retracted membrana tympani, a shortened and thickened stapedius muscle, foot plate of the stapes more or less firmly fixed in the oval window, subjective noises are present in the ears—to a distressing degree in many cases. Hardness of hearing is apt to be present, is progressive in most cases, and destroys the patient's happiness if not usefulness.

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*Read before the North Carolina Medical Society at Charlotte, N. C,

A small amount of hypertrophied tissue in the region of Rosenmuller's fossa may by its constant irritation and congestion lead to permanent deafness. This condition is often present after incomplete removal of adenoids when the central part has been removed or button-holed, as it were and the lateral parts left. Enlarged tonsils are very often the predisposing factor in producing the train of symptoms above enumerated. Also, to a lesser degree, the other causes mentioned, especially nasal stenosis, are causative factors.

Sinusitis is another complication often present in the mouth breather; one or several of the accessory sinuses may be affected. These sinus affections may be periodical or they may be constant. The periodical attacks come with each cold in the head which it aggravates, and the return to normal is longer and longer deferred, until it becomes constant and chronic and the catarrhal condition is changed to an empyæmia. These patients complain of taking cold easily, and speak of it as a constant cold in the head.

One of the first changes wrought by interference with nasal or normal respiration is a general congestion of the mucous lining, the upper respiratory tract, which is continuous with the mucous linings of the accessory sinuses, middle and internal ears. By blocking up the normal channels of exit the normal secretion is retained, changed, and decomposed, and adds to the irritation already established. The air becoming rarified is partially absorbed and a partial vacuum is formed causing congestion. The congestion finally leads to hypertrophy of the tissues involved. This newly formed hypertrophied tissue is finally absorbed and leaves the organs involved in a permanently crippled condition, robbed of their normal linings or mucous membranes.

By far the most important consideration is the effect upon the general health and physical development of children. The air improperly warmed, moistened and filtered entering the lungs is irritating and causes a thickening of the tissues of the alveoli and bronchi. Dry catarrh of the throat and chronic post nasal catarrh are often present to add to the discomfort of the sufferer. The result is a poorly developed chest and constitution.

Owing to the thickened mucous membrane, the proper exchange of gases in the lungs is interfered with, the waste products are not given off or exchanged for oxygen as they should be, but circulate freely in the blood, thereby robbing the tissues of their normal food. The crippled condition of the mucous membrane, unable to repel attacks of germs, offers a good field for their lodging and development. Consequently we find such diseases as scarlet fever and diphtheria are more fatal in the mouth breather. Pneumonia, grippe and other grave diseases more often terminate fatally in this class of patients.

In nursing and very young children adenoid vegetations are often present and not suspected. The respiration is noisy, there is slight nasal discharge, restlessness, disturbed sleep, dyspnœa, laryngeal spasms, and in some cases convulsions. The nutrition is diminished and often the child succumbs to a progressive inanition, the real cause never being suspected. If, however, the proper treatment is followed the difficulty of respiration ceases, there is marked improvement in the nutrition, sleep becomes normal and quiet, or, in other words, the transformation is complete.

EDITORIAL

DIABETES IN CHILDREN

In 1899 Bogoras contributed a monumental study on the subject of diabetes in children, collecting at that time practically all that the literature of the subject could show. His deductions were drawn from a study of 560 cases. In a recent monographic dissertation (Berlin, 1906), Brandes has assembled and digested all of the reported cases since the appearance of Bogoras' contribution, to which he has added a critical study of eleven cases from Heubner's clinic.

One may gather from this work that from the etiological, as well as from the clinical standpoint, diabetes in children shows an extremely variable picture. Only one fact remains constant, the almost uniformly fatal ending. Sex seems to exert little or no influence, although boys seem to be affected to a slight degree more than girls. As to age, only 14 cases are here reported as known to exist in the first years of life, and as far as Brandes knows there is but one case of congenital diabetes on record, and further as far as his studies go there are good reasons to doubt that congenital diabetes exists, even this one case being somewhat in doubt.

Heredity, in his opinion, is one of the important etiological factors, showing in 18 per cent. of the cases, trauma figures to a considerable extent, while infectious diseases, chilling of the body, teething, and shock are noted. An interesting case is that of Hagenbach, in which diabetes followed a severe burn, and Wegele's cases of chloroform diabetes are also of more than passing moment.

Typical cases exist with no symptoms. The end stage, however, is more or less classical. It has usually a short, sudden onset, with marked subjective signs, and the occurrence of acetone, di-acetic and oxybutyric acids in the urine is a forerunner of the end. The pulse is usually small, the temperature subnormal, the face pale and sunken, mental confusion, heavy breathing and occasionally convulsions are of sinister import.

Therapeutic attempts have been disheartening. Organotherapy has been unavailing, dietetics unsatisfactory, the Carlsbad regime unprofitable. In some instances, a buttermilk diet or Van Noorden's oatmeal gruel has been hopeful, but it is too early yet to say as to the ultimate results. Alkaline therapy at the time of acid intoxication is of value. The prognosis is admittedly bad, 83 per cent. death, in Brandes' new figures, but as the age of onset rises the prognosis is better.

LIME SALTS IN TUBERCULOSIS

The calcification of miliary tubercles is a recognized process in nature's attempts to replace the tissues which have been destroyed by the tuberculous process. Just what effect such calcification has as a purely physical agent in maintaining the form of the pulmonary tissue is not yet known, nor are we in a position yet to state whether so purely secondary a phenomenon is in any sense to be regarded as reparative. or as a resistive attempt to check cavity formation or to limit bacterial onslaught.

A call is made, however, upon the calcium salts of the body, and in this increased utilization of the lime salts it is logical to aid the natural resources by an added supply. G. Angiulli (Soc. Lancis. d'Osp. di Roma), working along these lines has reported excellent results from the free use of lime salts, which he has introduced in the usual doses, as the hypophosphites and glycerophosphites by the mouth, or by the hypodermic injections of 20 per cent. sterilized solutions of the chloride of calcium and calcium glycerophosphates. Such injections are given daily under strict antiseptic precautions, in doses of from 2-5 grams, usually in divided doses if the larger amounts are injected. In some of his cases as many as 90 injections were given.

In the first five years of his experiments improvement was observed, but no positive cures, but in the past two or more years he has obtained complete relief from all the symptoms.

From the experimental side, Michelozzi (Il. Morgagni, 21, 1906), working in the medical clinic at Pisa, has obtained not only clinical but anatomical cure in infected guinea pigs by means of a lime containing serum. The work here outlined suggests the desirability of continued study of the entire subject of the formation of lime soaps, so ably investigated by many of our American pathologists.

ABSTRACTS

The Urine in Infants.—CHAPIN (Arch. of Pediat., 1906, Vol. xxiii., p. 329). The author reports the results of various examinations. He describes a special urinal which he devised for collecting the urine, so as to avoid the unsatisfactory methods of the sponge and cup and the difficulties and dangers of the catheter. Albumin was found in 75 out of 86 cases of gastro-intestinal disturbance of varying severity to the amount of a trace in 29, faint trace in 36, heavy trace in 15. Casts were present in 37, hyaline, granular, epithelial, and mucous. Of 16 fatal cases 14 had albumin and 10 had casts in addition. Indican was present in 22 out of 32 cases examined. In 49 out of 57 cases of pulmonary disease albumin was present: trace 13, faint trace 30, heavy trace 6. Casts were present in 32. Of 17 fatal cases 15 had albumin and 10 had casts in addition. Indican was present in 16 out of 23 cases. In 31 out of 45 cases of other kinds of general illness albumin was found. In 9 out of 11 cases of cerebro-spinal meningitis, casts and heavy traces of albumin were present. Chapin regards these observations as proving that traces of albumin and a few casts are often produced by any disturbance of the bodily functions in infancy, that they are due to slight congestion and irritation of the renal tubules, and that they are of no special significance. Esbach's test was used, and its excessive fineness probably accounts for the frequency with which albumin was found.

Myotonia Congenita, or Thomsen's Disease.—MEARA (Arch. of Pediat., 1905, Vol. xxii., p. 812). The author reports a case in a boy aged 10 years, of healthy American parentage, the third of five healthy children. At twenty-one months he had an attack of measles, followed by pneumonia. At two years of age stiffness of the muscles of the legs, causing an impediment in gait, was noticed. At times the whole body was rigid. From three to six years of age the condition was at its worst. The stiffness involved all the muscles of the body and came on at the beginning of an effort of any kind. The rigidity quickly disappears and the muscles become supple. It was worst on fatigue, and in damp or very hot weather. Speech and mental condition were unaffected. The muscles of the eyes and of expression were involved, so too the tongue, causing a muffled tone of voice. The muscular development was very marked. The knee-jerks were active. Electrical examination: A continuous tetanic contraction was induced by a faradic current smaller than usual. The muscles were abnormally easily excited by galvanism. Vermicular contraction could be induced by a sharp blow with the finger or by stroking the muscle with the current closed at the cathode (statile galvanism).

Gonorrhoea in an Infant; Gonococcic Inflammation of the Scalp.—Apert and Froget (Archives Générales de Méd., May, 1906). A male infant, aged 10 months, had urethritis and a large phlegmonous swelling of the whole of the posterior hemisphere of the cranium. After 48 hours the redness and induration were limited to peripheral patches resembling those of erythema nodosum, while at the centre was a white and soft œdema which quickly disappeared. In the meantime two small papules formed on one of the patches and developed into pustules. The pus which they contained and the discharge from the urethra showed polynuclear cells and masses of gonococci. The origin of the gonorrhœa could not be traced. Though gonorrhœal vulvo-vaginitis in young children is far from rare, gonorrhœal urethritis is extremely so. Moreover, such phlegmonous inflammation of connective tissue is very rare in gonorrhœa. Its rapid and almost complete resolution is noteworthy. This is analogous to what occurs in the gonococcic peritonitis of little girls, the onset of which is marked by great acuteness, and is rapidly followed by complete resolution. Though the gonococcus is very tenacious on mucous surfaces its vitality in the cellular tissue is brief.

The Stages of Tuberculosis in Children.—Hutinel and Lereboullet (Brit. Jour. Children's Diseases, June, 1906). These authors find that the first stage often develops at a very early age, usually in the mediastinal glands, more rarely in the mesenteric, where it remains latent. The mode of entry is pulmonary, digestive, cutaneous or otherwise. This tuberculosis may remain latent indefinitely or become attenuated; it even seems in certain cases to confer a kind if immunity against further attacks. These are the favorable cases which end in more or less complete cure. as proved by the frequency with which tubercular foci are found at the autopsies made at the Enfants-assités (more than one-third of the cases), and by the fact that there were only 19 phthisical children among 18,000 that were sent to live in the country. In other cases nutritional disturbances occur, the so-called pre-tubercular state is established and instead of protecting, it predisposes to a further and more serious tuberculosis. This second stage is either an auto-infection, often excited by some intercurrent affection such as measles or whooping-cough, or is the result of a fresh access of tubercle from without, to which the debility caused by the latent turbercle renders the patient more vulnerable. It may then develop as either an acute, sub-acute or chronic affection. As it is curable it may sometimes become quiescent until fresh causes start a third stage similar to the second. This hypersensibility to attacks of the bacillus is comparable to that of certain serums and toxins (anaphylaxis), in which certain substances—"aggressines"—are formed in the exudation produced by the latent tubercle which prevent phagocytosis upon freshly inoculated bacilli. This evolution of infantile tubercle by stages is comparable to what occurs in other chronic affections such as syphilis, glanders and especially leprosy. It is thus important, not only to prevent tubercular contagion (the effects of which act equally on those free from and the subjects of latent tubercle); but also to strengthen the organism to defend itself against attacks of the tubercle bacilli, which too frequently exist there already.

A Form of Anaemia in Young Children.—E. Rist and L. Guillemot. (Bulletins de la Société Médicale des Hopitaux, Nov. 9, 1906). The writers have recently observed in young children several cases of a form of anæmia which resembles chlorosis and was first described by Hallé and Jolly as "chlorosis du jeune age." The following is an example:—A female child was born on Apr. 3, 1903, 3 weeks before term, and was suckled for 7 months. Then she was fed principally on sterlized milk, to which was added farinaceous food at the age of 12 months. Her health was always indifferent and she suffered from severe attacks of gastroenteritis, necessitating a purely milk diet for prolonged periods. From the age of one year she was of a pale yellowish color. She came under observation on Aug. 20, 1905, at the age of two years and 4 months. She was tall and thin but her face was a little puffy. Her complexion was greenish-yellow, like that of chlorosis. The conjunctivæ, lips, and mucous membrane of the mouth were pale. There were no signs of rickets, syphilis, or tuberculosis. She suffered from obstinate constipation but her appetite was good. She was apathetic and constantly depressed and was fatigued by the least exertion, but her intellectual development was normal. A diet more suitable for her age was ordered; the amount of milk was much diminished and cereals, eggs, fresh vegetables, fruit, and bread were given. The constipation disappeared and she gained strength. But on Sept. 13 her weight had not increased and neither her color nor her mental condition had improved. Blood examination showed hæmoglobin, 40 per cent; red corpuscles, 4,250,000; white corpuscles, 6,000; and marked poikilocytosis and polychromatophilia. A differential count of the white corpuscles was normal. Thus the principal change was diminution of the hæmoglobin value of the corpuscles, as occurs in chlorosis. Three grains of protoxalate of iron were given daily and rapid improvement took place, the mucous membranes became colored, and the child became lively. On Sept. 27 the hæmoglobin amounted to 56 per cent., on Oct. 23 to 73 per cent., and on Nov. 13 to 80 per cent.

This form of anæmia has never been observed in nurslings; the earliest age recorded is 11 months and from this the ages have varied up to 3 years. The complexion is yellowish pale, often with the greenish tint of chlorosis. The patients are puffy-looking; their muscles are soft and flaccid and their weight is subnormal. The mucous membranes are pale. The spleen is not enlarged. Murmurs have been heard at the apex or over the pulmonary artery and a hum over the jugular vein. Constipation is usually present. There may be digestive troubles—diarrhœa and greenish fœtid stools. These yield rapidly to treatment, but the anæmic symptoms are unchanged. The mental condition is strikingly apathetic and depressed; the child is constantly crying, never laughs, and will not walk or play. The number of red corpuscles is normal or almost normal, but the amount of hæmoglobin is considerably diminished, the hæmoglobin value of the corpuscles being generally below 50 per cent. The latter show poikilocytosis and polychromatophilia. Nucleated red corpuscles have never been found—a remarkable fact considering the facility with which they appear in the blood of children. The effects of iron are even more marked than in chlorosis. The analogy with the chlorosis of girls is therefore complete.

As to the etiology, the ordinary causes of anæmia in childhood—syphilis, rickets, tuberculosis, and athrepsia—are not found. The cases belong to several apparently diverse classes, but have a common bond. Some patients are twins; others are born prematurely; still others, and these are the most numerous, have been fed for an abnormally long time on diet consisting entirely, or almost entirely, of milk. As shown by Petrone, of Naples, all these conditions lead to privation of iron. Bunge proved that children are born with a considerable reserve of iron, principally contained in the liver. This enables hæmatopoiesis to go on during the early months of extra-uterine life, when the diet is exclusively milk. Milk is very deficient in iron, while the foods usually given on weaning—cereals, pulses, yolk of egg, cooked fruits—contain an insufficient amount. Hugounenq has shown that iron accumulates in the liver during the last 3 months of fœtal life. Thus a premature child or a twin may be born with an insufficient reserve of iron, which may become exhausted before the termination of lactation. On the other hand, a child born with a proper reserve of iron will have this exhausted if an exclusively milk diet is continued after the first year.

This disease, due to insufficiency of iron in the organism of young children, the writers term "oligosideræmia." This name they prefer to "chlorosis of early life," a designation which tends to produce confusion. Chlorosis is also an oligosideræmia, but unlike that under consideration, its causes are obscure and complex. It is essentially a malady of the genital evolution of the female. But how this evolution effects the amount of iron in the blood is a difficult problem. Of the various recent theories of chlorosis only one takes account of the fact that the change in the blood consists solely in diminution of the amount of iron in the red corpuscles. Bunge, who has done so much work on the physiological chemistry of iron, finds difficulty in believing that only during pregnancy is the large quantity of iron which constitutes the reserve of the infant absorbed and assimilated. He thinks that it is more probable that the female stores up iron in her liver and spleen for a long time before pregnancy—from the period of puberty. According to Lloyd Jones all young girls, even those in the best of health, have at the time of puberty a diminished amount of hæhoglobin in the blood.

Winter Diet for Infants and Children.—M. MacH. Hull (Atlanta Journal-Record of Medicine, Dec., 1906). This article is summarized by the author as follows: (1) In winter there is greater heat production, greater nitrogenous waste, and greater energy expended, and more fat stored up. (2) More food is needed and a relatively larger supply of protein and fats; in contrast to summer when more water and carbohydrates are needed. (3) To meet these demands, those foods should constitute the main articles of diet which contain more fat than protein and yield more calories per pound, principal among which are butter, breakfast bacon, oatmeal, cornmeal, and buckwheat.

Another boy, aged four and a half years, was brought to hospital on account of sudden abdominal pain on the right side, with vomiting, and appendicitis seemed the more likely as the boy had had frequent attacks of colic and vomiting. The resident surgeon on duty admitted the child as suffering from appendicitis but did not consider operation urgent. The next morning his condition was much the same, the vomiting had ceased, the temperature was 102, the pulse 120 and the abdomen but little distended. Dr. Broca decided to wait and watch events. The same evening the temperature rose to 104 with definite signs of meningeal reaction, convulsions, headaches, slight contracture of the neck and limbs; abdomen painful but without localization, chest free, pulse 140. This state persisted for two days and, although the pulse and respiration remained regular, Dr. Broca suspected meningitis, probably of pneumococcal origin. Lumbar puncture, however, withdrew clear fluid free from microbic infection. Only four days after admission was a slight *souffle* heard at the left apex with, on the following day, subcrepitant rales, and on the seventh day, a crisis and drop from over 105 the night before to 98 deg. the next morning. The signs of meningitis also disappeared and, from the moment of apyrexia, convalescence was rapid and complete. Beware, therefore, of the *immediate* diagnosis of appendicitis and weigh carefully the risks run by operating in the first twenty-four hours.

Etiologic Factors in Backward Children.—M. NEUSTAEDTER (Medical Record, Feb. 9, 1907). The author concludes after carefully studying 95 cases of backward children in one school that it is the addiction to alcoholic stimulants or strong decoctions of tea or coffee, or to the smoking of cigarettes, or to a combination of two or all of the poisons enumerated that far outweighs in etiologic importance all of the physical defects combined. After discussing in detail the effects of these substances he declares that the use of alcohol, tobacco and coffee or tea is an immediately exciting cause of backwardness in children.

Mental Risks of Adolescence.—T. S. CLOUSTON (Medical press and Circular, Jan. 16, 1907). The author claims that the mental risk of adolescence is so great that 75 per cent. of the chronic insanity now existing in England results from it. Almost all the typical secondary dementias, and most of the delusional insanities arise out of, or have as a preliminary stage, attacks of adolescent insanity.

The Somnolent Form of Tuberculous Meningitis in Infants.—LAFARCINADE (Jour. de Medicine et de Chirurgie Pratiques, Nov 26, 1906). The belief that tuberculous meningitis rarely occurs under the age of 2 years is an error due partly to the fact that in young infants the disease often assumes a latent form which is liable to be mistaken. The writer, who has specially studied the somnolent form of tuberculous meningitis described by Lesage and Abram, found that more than half of a series of 42 patients were below the age of 2 years. The affection in infants is frequently obscure, and has usually been described as assuming an eclamptic or a hemiplegic form. In the former, after a convulsive attack, fever and rigidity of the neck are observed with more or less marked paralysis of hemiplegic or paraplegic type. Convulsions, local or general, then occur and prove fatal in 2 or 3 days. In the latter form, an infant, aged from 6 to 12 months, after slight fever is observed to have a more or less complete paralysis of one side of the body, followed by local or general convulsions. This is succeeded by rigidity of the neck, bulging of the fontanelle and exaggeration of the reflexes, the patient becoming comatose till death.

To these must be added a somnolent form which is even more liable to be unrecognized because of its insidious onset. It is characterized by progressive somnolence, emaciation, "ocular catalepsy," and irregularity and variability of the pulse. The peculiarity of the somnolence is its progressive nature. An infant becomes unusually quiet, it may be slightly fretful, and sleeps in an apparently natural manner 4 or 5 times a day, which the parents attribute to fatigue. This increases gradually till the sleep becomes almost continuous, the child waking only to drink, and finally becoming comatose. By "ocular catalepsy," the writer means a peculiar fixity of gaze due to absence of winking, a result of amblyopia and loss of the conjunctival reflex. The patient lies with the eyes half closed, or more often open and staring with the vague fixed look of the blind. The emaciation is gradual but progressive, and when the condition is well advanced may be readily perceptible to the eye. In other cases it is so gradual that only the constant loss in weight of 1½ to 2 oz. daily is to be observed. When the patient survives for some time the emaciation may be extreme. Instability of the pulse may be sometimes observed from an early period of the disease. In an hour or less the pulse-rate may rise from 80 or 90 to 140 or 160 without obvious cause, the rhythm remaining regular. To these symptoms there are often added vomiting and diarrhœa of variable severity, usually accompanied by some meteoric distension of the abdomen. These symptoms prove intractable and are apt to obscure the gravity of the condition by suggesting a diagnosis of gastro-enteritis.

This prodromal period may last about 15 days, after which the symptoms assume a uniformity which renders the condition easily recognizable. The infant lies on its back or side but rarely in the position characteristic of other forms of tuberculous meningitis. It sleeps continually with half-closed or widely open eyes. The vomiting and diarrhœa continue or may now appear for the first time. The pulse is strong and still regular but varies from hour to hour from 100 to 160, and the temperature is subfebrile. In a few days the patient is semi-comatose, with fixed staring eyes, while the daily loss of weight is 1½ to 3 oz. The pulse while still variable begins to present irregularities.

A few days later coma is complete, and the patient is perceptibly emaciated, while the unprotected conjunctivæ are apt to become inflamed. The pulse becomes rapid and very irregular, while the temperature rises towards the end. The respiration becomes embarassed and death occurs without a struggle, all treatment proving useless. The duration of the fully declared condition is short—8 to 10 days.

Early Diagnosis of Incipient Thoracic Tuberculosis in Children.—M. A. D'Espine (Bulletin de l'Academie de Med., LXXI No. 5). The author's further experience has confirmed previous assertions in regards to the frequency of the primary localization in the bronchial glands of tuberculosis affecting the thorax, and also the reliability of his method of diagnosing this primary tuberculous affection of the bronchial glands, before involvement of the lung, by auscultation of the voice. In 1904 he published a report of 119 cases of the kind, and his statements as to the unsuspected frequency of this primary localization of tuberculosis have been corroborated by the recent announcements of Vallée and Calmette in regard to the intestinal origin of tuberculous affections in the thorax. Auscultation as the patient pronounces the words "three hundred and thirty-three" (the words are more resonant in the French—"trois cent trente-trois"), or auscultation as the child cries will reveal a tone superadded to the voice which he calls "whispering" (chuchotement) in the first stage and "bronchophony" in the more advanced stage. In the normal child the organ tone of the trachea stops abruptly at the spinous process of the seventh cervical vertebra, where the lung commences, but with a pathologic process in the bronchial glands the bronchial tone is heard further over the region corresponding to the principal location of the glands. The bronchial organ tone is accentuated by the chain of tumefied glands surrounding the air passage and sometimes continuing back nearly to the spine. The stethoscope is useful to define the extent of the ronchophony, which may extend to the first four dorsal vertebræ or merely to one of them, or to the seventh cervical, but direct auscultation with the ear gives more definite results. If the child is told to pronounce some words in a low tone, an acoustic phenomenon is noted in case of a bronchial adenopathy similar to what Baccelli calls "aphonious pectoriloquism." This D'Espine calls "whispering" (chuchotement). Pronounced dulness on percussion of the spinous processes of the first dorsal or seventh cervical vertebra does not appear until the process in the bronchial glands is in an advanced stage. Interscapular dulness is likewise a sign of far advanced lesions, in the child, as also the bronchial souffle. The finding of this souffle associated with the normal superficial vesicular murmur indicates that the trouble is in the glands, not in the lungs. He cites a number of instructive examples, among them the case of a healthy child of healthy parents, who, after spending the summer on a farm, exhibited slight fever for a time with marked bronchophony. Anemia developed and the child succumbed in eight months to a tuberculous meningitis. Autopsy disclosed tuberculosis of the mesenteric and bronchial glands and pericardium, but no lesions in the peritoneum or lungs. It was found that the cow on the farm whose milk had been taken freely by the child was in an advanced stage of tuberculosis. The father of the child was a physician and professor in the university (Geneva), and he inaugurated a campaign against tuberculosis in cattle which led to drastic regulations in regard to tuberculin testing of cattle. D'Espine adds that he has found the bronchophony almost constantly in the cases of surgical tuberculosis which he has encountered, as also in tuberculous meningitis. Bronchophony has never failed him, while the most reliable other measure in this incipient, latent stage—radioscopy—sometimes fails, as in a case recently published by Mouriquand in which extensive glandular lesions gave no sign of their existence under Roentgen inspection.

Acidified Milk in Infant Feeding.—Morse and Bowditch (Arch. of Ped., Dec. 1906). The writers have reached the following conclusions as the result of an extended experimental and clinical study:

Buttermilk, buttermilk mixtures and milk mixtures acidified with lactic bacteria are safe foods for infants, whether well or ill. Infants can thrive and gain on them for considerable periods of time. The use of a routine buttermilk mixture, as has been the custom in the past, is not as rational as that of an acidified milk mixture modified to suit the individual case or of buttermilk modified by the addition of cream and milk sugar. The preparation of such acidified mixtures, while not difficult, is not very practicable for private work. These mixtures and buttermilk are almost always taken well. The results obtained from acidified milk mixtures in cases of malnutrition and chronic disorders of digestion are not materially different from those obtained from the use of other preparations of milk of the same percentages. They are, however, worthy of trial in cases of intractable disturbances of digestion, because some cases do much better on them than on other forms of modified milk. Practically the same, and in some instances better, results are obtained in these conditions with pasteurized buttermilk as with acidified milk mixtures. This fact suggests strongly that the good results which are obtained with buttermilk mixtures are due to their low fat content in combination with a large amount of proteid in an easily digestible form, and not to the acidity or to the action of the bacteria. Pasteurized buttermilk gives very good results when given as the first form of milk food after the initial periods of water and starchy diets in acute intestinal indigestion and infectious diarrhea. It is possible that unpasteurized buttermilk will give even better results because of the action of the lactic acid bacteria on the intestinal flora. Fat free milk acidified with pure cultures of lactic acid bacteria ought, however, to be safer and more reliable than commercial buttermilk.

Constitutional Low Arterial Tension in Children.—L. F. Bishop (Journ. A. M. A., Nov. 24, 1906). The author calls attention to a condition observed in children, of constitutional low arterial tension, probably of nervous origin, though the symptoms are circulatory. The pulse in these cases would suggest in others the prostration of acute or chronic disease, but the condition is habitual, there are no heart lesions or cardiac symptoms, and the kidneys act normally. The defect seems to be in a lack of the normal back pressure in the peripheral circulation, the blood circulates too easily. To differentiate such a case from cardiac weakness one need only make a demand on the circulation by active exercise or observe the response in the case of acute disease. Such children suffer much discomfort from lack of circulation, as by cold feet, depression, constipation and skin disorders. They are also subject to catarrhal disorders, but they thrive on active exercise and on every sort of mental and physical exercise that stimulates the circulation. Very hot baths of short duration benefit them, but they do not respond well to cold baths. Though the class is not a large one the cases are sufficiently numerous to be met by every pediatrist. The importance of recognizing the condition lies in placing it where it belongs, and not seeing in it the accompaniment of a supposed anemia or cardiac disease or a sequel of some local disorder. It is a condition that must be met by a proper regimen, and is one that has a tendency to improve or even to disappear after adolescence. Its proper recognition will relieve anxiety on the part of the family physician, it is not a true failure of the circulatory apparatus resulting in an inability to respond to the demands for pressure, nor is it due to the exhaustion from prolonged high arterial tension. This latter, secondary low arterial tension is rare in children. Bishop recommends a careful study of this class of cases to students of the circulation.

The Diagnosis of Empyema in Children.—G. S. Middleton (Practitioner, Nov., 1906). There are no trustworthy signs to show whether an effusion is serous or purulent. Those commonly mentioned are as follows: 1. A chart with marked oscillations of temperature is regarded by many as significant of purulent effusion. Such oscillations are equally common in serous effusions, many of which are of tuberculous origin. 2. Rigors and sweating are not characteristic of pus; they are frequently present in serous effusions, and absent in purulent. 3. It has been said that whispered pectoriloquy over the dull area indicates serum, while bronchophony may be present if the effusion is purulent. But the former condition may be present in cases of large purulent effusion. 4. Bulging, redness, œdema, and tenderness over the intercostal spaces no doubt mean purulent effusion, but the diagnosis should be made long before these signs have developed. 5. The history may help, as will be shown, but it is not always to be relied on.

In all doubtful cases, recource should be had to an exploring needle, but the exploration should never be made except in the patient's house. A hypodermic syringe fitted with a long needle is all that is required. If it is thoroughly sterilized, and the skin thoroughly cleansed, it may be inserted with little danger. If pus is found in quantity sufficient to fill the syringe, there is empyema; but, if only a few drops of pus are found, they may come from the pleural cavity or from the lung. The microscope will help to decide. If the pus is from the lung, there will probably be either (*a*) catarrhal cells containing carbonaceous pigment; (*b*) fragments of yellow elastic lung tissue; or (*c*) some pus cells arranged in rows separated by threads of mucus, as seen in sputum. One further source of error remains. In some cases of recent empyema the fluid in the pleural cavity, when the patient is in the erect posture, separates into two layers, the majority of the pus cells falling to the most dependent part, and the supernatant fluid looking like serum. If the needle is introduced into this supernatant layer, a wrong diagnosis may be made. All the above applies to both adults and children.

Empyema in childhood is frequently diagnosed as pneumonia —an error not sufficiently emphasized. It depends on the facts that, in many cases of acute empyema the history is like that of a pneumonia, and the physical signs are misleading, tubular breathing being audible over the dull area. Two signs, of much diagnostic value in the adult, are generally absent:—(1) A young child has no expectoration, and hence no rusty sputum; and (2) the child's voice is too feeble to give rise to a tangible fremitus, so that it is impossible to compare the affected with the sound side. The consequences of error may be disastrous. In many cases the diagnosis can be made only by exploratory puncture.

In all cases in which a diagnosis of pneumonia has been made in children empyema ought to be suspected, and an exploratory puncture made:—1. *If there is undue delirium.*—The pneumonia of childhood is not characterized by much delirium. If there is wild delirium, especially early in the disease, say on the second or third day, the disease is probably empyema. 2. *If there is marked oscillation of the temperature.*—In pure pneumonia the oscillations, up to the crisis, rarely go beyond a degree, or a degree and a half; great oscillations, therefore, are very suggestive of empyema. 3. *If there is tenderness over the affected side.*— Marked tenderness is unusual in pneumonia. 4. *If there is any fulness in one or more intercostal spaces in the dull area.*—This is most likely to occur in empyema after more than a week's duration, but may occur early. 5. *If there is prolongation of the fever, with or without acute symptoms, beyond the ordinary period of crisis of pneumonia.*—Unless the persistence of the fever is explained by well-marked evidence of the extension of the pneumonic process in the same, or in the other lung empyema should be suspected. In most such empyematous cases the temperature comes down a degree or two about the fifth or sixth day, and goes on with oscillations indefinitely, the illness becoming apparently less acute, but liable to so-called "relapses." Many such cases are admitted to hospital as curious cases of pneumonia. 6. *If there is any doubt, every reasonable precaution having been taken to come to a correct diagnosis.*—This is because of the great importance, in regard to treatment, of an early diagnosis in the case of empyema.

Empyema in children may also be confounded with phthisis. The misleading facts are the presence, in some cases of empyema, of cavernous breath sounds, and large, hollow, moist râles. In most of the cases which have come under the writer's notice there has been extensive dulness over one side with, in many instances, Skodaic resonance at the apex. The very extent of the abnormal resonance in such cases should make one suspect that the disease is not phthisis, and a careful scrutiny of the history should serve to point to empyema. In some cases, the signs—dulness, tubular breathing and moist, clicking râles—are limited to the apex of one lung, and may readily be interpreted as those of tuberculous excavation. In such cases, the history is the safeguard. All the writer's cases had been diagnosed as pneumonia that did not resolve, but, with or without a slight remission, "passed on into phthisis." These are cases of encysted empyema. The acuteness of their onset is unlike that of tuberculosis, and should raise suspicion leading to exploratory puncture.

Cases of fatal exploratory puncture of the chest have been published (Review, p. 83), and may happen in the hands of the most careful. Dr. G. Carpenter first drew attention to this danger, and recently warned against its routine use in diagnosis before ordinary methods are exhausted (Review, 1906, p. 4). But the opposite danger also requires to be emphasized—the ease with which a careful man may overlook an empyema—and the frequency with which it occurs, the mistake being corrected too late for successful treatment. Many children are lost whose lives might have been saved by timely puncture. Practitioners should not be afraid to use the needle, though they should reserve it for cases in which careful examination leaves doubt.

Laparotomy in Infancy and Early Childhood.—G. W. Hunter, (Med. Age, July 25, 1906). The author reports on the case of a child one day old operated upon to arrest internal hemorrhage due to rupture of the umbilical artery without the administration of an anæsthetic, which recovered without incident. He thinks that lack of appreciation that the patient is an infant, consequently that certain changes or modifications in management and treatment are essential, is probably responsible for the recorded unsuccessful surgical operations performed upon young subjects. As of prime importance he considers rapidity of operation, prevention of the slightest hemorrhage, and the sustaining of the body temperature. This child should be well nourished before operation, and feeding should be resumed as soon as permissable afterwards. He then records series of grave operations which have been performed upon young children with success, where these precautions have been regarded. His conclusions are as follows:—1. By observing certain modifications in management and treatment, even major surgery in the young should not be necessarily attended with greater operative mortality than that which follows similar measures in adult life. 2. Barring unforseen and unpreventable surgical accidents, the high death rate which has hitherto been regarded as inevitable following operations upon the young may be largely reduced by the exercise of proper judgment in the application of modern scientific surgical and therapeutic principles.

Alcoholic Cirrhosis of Liver in Children.—E. Jones (Brit. Jour. Children's Diseases, Jan. 1907). The histories of two cases of alcoholic cirrhosis of the liver in children, one of the patients being aged 16 months and the other 2 years and 11 months. Although there was an alcohol history in both cases, the alcohol had not been administered in excess. The first patient had received wine, about a tablespoonful, twice a day, for 11 months, for the purpose of strengthening the child's health. The second patient, following an attack of whooping-cough, was given brandy, in doses of a dram, twice a day, for about five weeks. Both patients did well under treatment.

Extensive Leucoplakia Beginning in Childhood.—M. B. Hartzell, (Med. Record, Feb. 9, 1907). The author reports on a case of leucoplakia in a child 11 years old. There was present an affection of the skin which consisted of irregularly shaped, variously sized patches of dirty gray spines on the sides of the neck, and hempseed sized, flat, slightly elevated, scaly lesions scattered over the back. These lesions were regarded as keratosic. Besides the cutaneous disease, the entire mucous membrane of the lips, tongue and cheeks was a bluish white. The skin disease had lasted 18 months. The duration of the leucoplakia was not certain. After treatment the skin affections disappeared, but the leucoplakia was scarcely affected. About four years later an epithelioma of the tongue was discovered. The growth was removed, but a few hours later the patient unexpectedly died from what was supposed to be pulmonary embolism.

Some Complications of Tuberculous Infection of the Lymphatic Glands in Children.—Theodore Fisher (The Clin. Jour., Vol. XXIX, No. 7). We hear much, the author says, of tubercular disease of the mesenteric glands, and these glands are frequently found enlarged and caseous in cases of death from tuberculosis in children. Comparatively rarely, however, do they exist as a solitary area of tubercular disease, and when the disease is thus limited they are still more rarely of such a size that they can easily be detected on palpation of the abdomen. Yet as late as the age of 11 years I have known a row of caseous mesenteric glands give rise to a difficulty of diagnosis, and in the abdomen of a girl who suffered from attacks of colicky pain of sudden onset the discovery of a somewhat elongated mass suggested the possibility of the presence of a chroinc intussusception. An exploratory operation showed, however, that the mass was composed of enlarged mesenteric glands, which may have been a mere accidental association of the attacks of pain. Although in this case it was not clear that the glands were the cause of the symptoms, enlarged tuberculous glands may, when a localized peritonitis occurring over them leads to the formation of adhesions, be indirectly the cause of intestinal obstruction. I do not remember having met with a well-marked example of this; but some years ago, when Mr. Targett used to send me morbid anatomy specimens in exchange for others, I received from him an interesting example of this complication. A coil of small intestines was adherent to a caseous mesenteric gland and obstruction had occurred at the point of adhesion. The intestine was greatly distended above and collapsed below.

Probably, unless some fatal form of tuberculosis arise, caseous mesenteric glands generally end in becoming calcareous; at least, the not very uncommon presence of calcareous mesenteric glands in adults dying of non-tuberculous diseases would lead one to think so. Occasionally, however, during childhood suppuration may arise in these lands. I once met with the case of a boy, aged six years, who was brought to the out-patient department ill, with a high temperature, complaining of abdominal pain. There was virtually no tenderness, and little rigidity of the abdominal wall; but in the centre of the abdomen a hard, rounded mass could be felt about the size of two fists. The boy was admitted, and an abdominal operation showed the mass to be an abscess which had originated in caseous mesenteric glands.

Tuberculosis of the lymphatic glands within the abdomen may be a source of serious complications, but tuberculous disease of the glands within the thorax is a greater source of danger. Whether the tubercle bacillus enters the body mainly by the intestinal canal or by the respiratory passages has been somewhat of a vexed question, but there is not the least doubt that caseation of the bronchial or mediastinal glands is much more common than the same affection of the glands in the mesentery. It is not only more common, but it leads to more serious results. When the tubercle bacillus invades the lungs of children it does not cause slowly spreading disease, as is usually the case in adults, but gives rise either to acute miliary tuberculosis or to caseation which rapidly advances and often quickly breaks down. Tuberculosis of the lungs in children, generally so much more acute than in adults, nearly always begins in comparatively chronic tuberculous disease of the bronchial glands. This fact is well known and is often insisted upon, yet possibly one small pathological fact which has an important bearing upon clinical signs is sometimes forgotten, and may be referred to in passing.

Acute Non-suppurative Encephalitis in Children.—Isaac A. Abt (Journ. A. M. A., Oct. 13, 1906). This is neither a rare nor a new disease among children. Dr. Abt refers briefly to mention of the condition in the literature and states that in reviewing the literature one is impressed with the fact that the disease has several clinical types. He reports two cases, in one of which the disease at first presented the symptoms of tuberculous meningitis, while in the other it might have been an acute infection such as pneumonia or almost any other infectious disease in process of development. Abt states that the etiology of acute non-suppurative encephalitis may be summed up briefly in the words infection and intoxication. He says that there is probably no infectious disease known which has not at some time been reported as being followed by cerebral hemiplegia. All authors, he states, mention trauma as an exciting cause or as having some direct remote relation to this disease. He quotes cases reported in the literature showing the diversity of symptoms.

Tuberculous Infection in Children—Morse (American Journ. of Med. Science, Oct. 1906). The author considers the separation of children from tuberculous adults the most simple and rational method of protecting them against contagion. Such separation, however, is often impossible. The only practicable method then is the observation in the best way possible in the individual case of the principles of hygiene and habitation. When a family is in reduced circumstances the public must step in and help. What can be done as to the separation of the children from the patients and as to sanitation depends in each case on the circumstances of the family and the provisions for the care of the tuberculous made by the public. That is to say, protection against tuberculosis is largely a question of money.

Rheumatic Purpura in Children.—Manasses (American Med., July 1, 1905). The author reports on a series of three cases of rheumatic purpura. Case 1. A child of three complained of headache, which was followed by a rise in temperature, from 102 degrees F. to 104 degrees F., there was sore throat, and nausea. On the third day a purpuric eruption with lesions of varying size appeared first on the legs, then on the body and arms. On the lower limbs there were a number of large hemorrhagic blebs which soon became necrotic. The knee joints, wrists, ankles, were puffed and tender. The fingers of the right hand were contracted, the middle finger remaining so after recovery. On the sixth day of the disease the child could not distinguish objects placed in front of the eyes and would not withdraw when a light was placed near. This condition lasted two days. Recovery was slow and the purpuric and rheumatic symptoms did not disappear under four weeks.

Case 2. This was a girl of nine, whose mother and father were both subject to muscular rheumatism. The child often had pain in the limbs which was dismissed as "growing pains." She was suddenly taken ill with vomiting and chills, followed by fever, aching in the limbs, and tenderness in the joints.

The next day petechial spots appeared on the limbs and lasted ten days. Salicylates were prescribed and the rheumatic symptoms soon subsided. The disease ran a mild course.

Case 3. The patient was a boy of eight years. Four weeks after an attack of scarlatina he fell ill with vomiting and fever. Although he complained of pains, there was no localized tenderness or involvement of the joints. About two and a half days later small ecchymoses appeared, but only on the arms and legs. With the eruption, the pain and fever subsided. The spots gradually faded and entirely disappeared in eight days. Recovery was rapid and without complications.

Why Percentage Feeding Fails.—H. Lowenburg (Journal A. M. A., Feb. 16, 1907). The causes of the numerous failures in percentage feeding which tend to bring the method into disrepute, are accounted for by the confusing multiplicity of methods proposed, giving details instead of general principles, by the lack of intelligent application of the methods when used, and the tendency to try to follow details and to obtain impossibly accurate percentages. Too much also is expected in the immediate gain in weight of the child and the result is consequently disappointing. The biologic and physiologic differences between cow's and human milk are not sufficiently recognized, and this is one of the chief causes of failure. Sufficient care also is not given to prevent contamination of the milk supply and the time between the cow and baby should be shorter. Another cause of failure is lack of diagnosis of the cause of the indigestion, whether of fats, sugar or proteids, which each call for a different modification. The failure of the physician also to think in percentages instead of going by formulas of ounces, etc., is pernicious in its effects and physicians also too often fail to teach the mother or the untrained nurse the details of the mixing methods, assuming that they would not follow them out if instructed, and at the same time they do not themselves sufficiently supervise the feeding. Children thus fed by percentage methods should be seen at least once a week and details noted of the child's progress in weight, the condition of the excretions, the amount of sleep, times of feeding, regularity of feeding, etc., and every detail of infant hygiene. The easiness of preparation of proprietary foods is another misleading factor. It deludes parents and thoughtless or indolent physicians into losing their sense of responsibility. As a makeshift or temporary food, as on a journey or when cow's milk can not for the time be obtained, they are of service, but as permanent infant food they are a snare.

Early Signs of Tuberculous Meningitis in Children.—W. H. Summons (Intercolonial Med. Jour., Vol. XI, No. 11). Cases of tuberculous meningitis may be classed in two divisions: (a) those where a pre-existing tuberculous focus is known to exist; (b) those where there is apparent health till symptoms appear. Under (a) should be included cases of tuberculous meningitis subsequent to tuberculous bronchial or mesenteric glands, joint or spinal mischief, tuberculous skin lesions with adjacent glands affected. With the exception of bronchial glands, considering the number of cases noted, meningitis is rare in this division, and when it does occur, the mode of onset is usually rapid, as is shown by the three following cases: 1, A boy, nine years, with an old spinal caries, which was regarded as cured, was admitted to hospital with apparently an acute pneumonia—the onset was so rapid, and all the symptoms at first pointed to the respiratory system. Next morning he was semi-comatose, and progressed as a tuberculous meningitis. The autopsy showed generalized tubercle. 2. A girl, 10 years, with a much deformed tuberculous spine, was brought some distance in a cab, and in hospital was examined several times. Without warning she began to vomit frequently, which, with abdominal pain and constipation, almost looked like intestinal obstruction. Very rapidly, however, definite signs of further meningeal irritation became evident. 3. A boy, eight years, who had been in a double Thomas splint for two years, the first week after being allowed out of it fell off a table, and within forty-eight hours had severe headache, photophobia, vomiting, and frowning. He died within ten days of general tuberculosis. Not always is the mode of onset so rapid, as for example, a child, under Dr. Robertson's care, who recently died in the Austin Hospital. She was 13 years old, and had a tuberculous hip for three years. Gradually she became dull, would not talk, became rigid, and lay in a semi-comatose condition for four months before death. From the observation of many cases, the rapid mode of onset and progression of symptoms are the more common in this division.

Under division (b) must be included all other cases—most cases with tuberculous bronchial glands, tuberculous otitis, obscure abdominal turbercle, etc. These cases frequently present great difficulties from a diagnostic standpoint. The modes of onset in this group of cases may be divided into at least five classes: (1) *Change in Demeanor.*—Of all the early symptoms, this is one of the most important. When a mother comes, stating her child is "different," and "seems strange," it is always wise for the medical attendant to be careful, and not to say it is an over-anxiousness on the part of the mother. Many cases of tuberculous meningitis start this way, and it may be 7 to 21 days before definite signs show themselves. (2) *A Convulsion.*—This is the first symptom noticed and may be taken as the mode of onset in about 8 per cent. of cases. The convulsion is general in many instances, but when limited to one extremity is, of course, more suspicious. After the convulsion there are usually definite signs to be found. (3) *A Slow Oncoming Drowisness After Pertussis or Measles.*—Some of these cases give the signs of enlarged bronchial glands, and in nearly all, the primary seat is a caseous bronchial gland. The patient is drowsy, wants to be let alone, lies about, dreads the light, and complains of headache. There is often a loud-sounding cough. (4) *With Signs of Intra-cranial Tumor,* as (a) where a child presented the classical, general signs and symptoms of brain tumor without focal ones for 10 weeks. She had extensive tuberculous mischief at the apex of the right lung, and ultimately died of general tubercle. On a post-mortem examination, five small tuberculous granulomata were found in the brain. (b) Where the case appeared to be an intra-cranial tumor localized to the right cerebellum. The patient was trephined over both cerebellar regions without any tumor being discovered. He died shortly after the second operation. On autopsy, no granuloma was present, simply an extensive miliary tuberculous sowing, with dilatation of the ventricles, being found. (5) *Like Typhoid Fever.*—The child slowly becomes dull and apathetic; the temperature gradually rises like the Wunderlich rise of typhoid fever. The case is one of general tuberculosis, with the meningeal irritation manifesting itself late.

School Anemia.—Unruh (Deutch. med. Woch., Oct. 11, 1906). The author objects to the term "School Anema," because it suggests that the anemia is due to school attendance rather than that it is a form of illness which attacks children during school age. The school does not play an etiological part in a very large number of these cases. Children who are tired and exhausted, who look pale, who have no appetite, who suffer from constipation and a number of minor symptoms, are often met with, and the school teachers complain that they are lazy, inattentive and fractious. The symptoms are said to have appeared soon after the child started attending the school, or soon after the child has reached the higher classes. The objective and subjective symptoms are particularly manifest at the end of the day's lessons, and especially after a day in which an extra amount of work has had to be got through. The general impression is that the school has overburdened the child and has caused the anemia. The author does not discuss the question whether the schools overburden children in general, and excludes all those who show signs of mental or physical degeneration and affections of the heart. The anemic children may be divided into four classes: (1) Pure anemic or chlorotic children; (2) Children who show signs of myocarditis; (3) Children who suffer from a hypoplasia of the heart; (4) Children who are affected with cyclic or orthotic albuminuria. The school is to a certain extent responsible for the condition in the first group, and very few children escape the exhaustion and tiring-out symptoms of anemia after having gone through their hardest school years. Perhaps boys are more frequently affected than girls. Both young and elder children suffer from this form of anemia, and it is necessary to distinguish it from chlorosis, which attacks the children at a slightly later age. Not only scarlatina and diphtheria, but also a number of milder children's illnesses, sore throat among others, may give rise to myocarditis.

The diagnosis is easy, as soon as attention is turned to the heart. The affection attacks both sexes equally, and may occur at any age, but the inclination towards it appears to increase with age. Hypoplasia of the heart and large vessels as a cause of anemia in school children has certainly nothing to do with the school, but very little is known of its causation. Girls are more commonly affected with the albuminuric form of anemia than boys. It would be extremely difficult to produce any proof in support of the argument that the school is responsible for this form. While he does not see his way to decide which group is most common, the author points out that the frequency of myocarditis and disturbances of growth in children is often much underrated.

The treatment depends largely on the form present. It would be impossible to insist on the child remaining away from school on account of pure anemia unless the signs were extremely marked, but the detection of a myocarditis makes this necessary. Whilegreat care must be taken in cases of cyclic albuminuria, it is not always necessary to keep the child at home. Exercise and muscular work are more likely to reproduce the albuminuria after it has disappeared than dietetic errors. In deciding whether a particular child should be kept at home or not, the standard of knowledge, the age, sex and social position must all be taken into account. Violent exercise sports and gymnastics are often prescribed as cure-alls, but such lack of discrimination is highly dangerous. As a rule, rest and care are required, for a period to be determined in each case. When the medical advisers considers that it is safe to commence some exercises, this will have to be exactly measured and excess strictly forbidden.

Certified Milk in Small Cities.—C. W. M. Brown (Journal A. M. A., Feb. 16, 1907). An account of the experience of Elmira, a city standing almost at the bottom of the list of towns with 30,000 population or over, in securing a certified milk supply. Six physicians were selected by the Elmira Academy of Medicine, who gave their personal attention to the matter and were appointed as a milk commission. They called a joint meeting with the milk dealers, to which not more than twenty of the latter responded; they listened respectfully and did nothing. A personal canvass was then made with the better class of dealers, and one was found, a woman, who had already some acquaintance with the requirements of producing clean milk. After some consideration she took up the work, built a new barn and had her herd tested for tuberculosis. The commission selected its experts and the first certificate was issued April 15, 1903. A 10,000 bacterial count standard was established, which has only been exceeded twice in three years. Butter fat 3.5 to 4.5 per cent. and other usual conditions were imposed. The milk is bottled a few minutes after milking, put in a crate, the top of which is filled with cracked ice, whence it is delivered to customers. Notwithstanding the producer's indisposition to advertise, the sales have gradually increased and besides supplying local consumers the milk is shipped daily to Binghamton and New York City. At present another dealer, also a woman, has begun to sell high-grade milk in bottles, and there has been an improvement in the milk supply generally. The city health officer is on the commission, and through his influence an excellent ordinance governing the sale has been passed. The milk inspector of the local board of health has been made a state deputy health officer, thereby empowering him to enter on the premises of the producer. Brown believes that what has been done at Elmira can be accomplished within the next twelve months in a score of other cities of like population which are now without a clean milk supply.

A Clinical Study of Relapses in Typhoid Fever of Children.—Koplik and Heiman (Arch. of Ped., Jan. 1907). After a study of a series of cases the authors arrive at the following conclusions: Relapses in typhoid fever are more common in children than in adults—about 15 per cent. in the former. The mortality is exceedingly low. The usual duration of a relapse in a child is from one to two weeks. As a rule the temperature is continuously high between a rapid rise at the onset and a rapid fall to normal at the termination of the relapse. A constant symptom, in addition to the prolonged temperature elevation, is enlargement of the spleen; roseola is present in about 75 per cent., leukopenia in about 60 per cent., and mild abdominal symptoms in about 50 per cent. of relapses in children. Complications in these cases are mild and infrequent. For the prediction of a relapse no reliable signs are furnished by the character of the interpyrexial period nor by the course, duration and severity of the original attacks. Persistent enlargement of the spleen after defervescence occurs in a fair proportion of relapse cases; and a relapse following a mild primary illness is not as likely to be repeated as one occurring after a severe original attack.

Simplicity in Infant Feeding.—C. W. Townsend (Journal A. M. A., Feb. 16, 1907). The advantages of simple, not too formidably mathematical, rules for the percentage of milk feeding of infants is suggested by this writer. There is less liability of error by the mother or nurse, it is easier for the physician to prescribe and it is natural to presume that the less the manipulation generally, the better for the milk. It is better to get a clean cow's milk and modify it to suit the case than to try to improve an unclean milk by centrifugalization or Pasteurization, and as the dilution of whole milk would cut down the fat too much it is necessary to begin with a cream as the basis. He prefers pouring off the top milk as the simplest and, on the whole, the safest method of obtaining the cream and one giving very uniform results. As a rough rule, one may remember that in a quart of milk that has stood at least four hours, the upper six ounces contains about 14 per cent. of cream, the upper 8 ounces 10 per cent., the upper 12 and 16 ounces about 8 and 6 per cent., respectively. The amount of fat must be regulated by the appearance of the stools, and it is better, as requiring less manipulation, to dilute this top milk with water than to combine a rich cream, a lower or fat-free milk and water. Instead of pure water, a cereal water can be used in even the youngest infants, and some have difficulty in digestion without it. After the age of 6 months a cereal modification is better for all infants. It is safest to begin with a mixture weak in all its ingredients and increase the strength gradually. A newborn baby can be put on a mixture of only 3 ounces of the upper 8 ounces of top milk in 20 ounces, and the strength increased by adding half an ounce of top milk and abstracting an equal amount of water every second day until 8 ounces of top milk are given in a 20-ounce mixture. Many infants who have failed on much modified milk mixtures will, he says, respond at once when these simple principles are borne in mind. In a note he gives a simple rule for percentage calculation and explanatory formulas for those who care to use the method.

Milk Modifications.—D. R. Brown (Journal A. M. A., Feb. 16, 1907). The author goes at considerable length into the calculation and formulas for accurate milk modification in infant feeding. While some of these appear decidedly complicated, he summarizes them more simply toward the close of his paper. As he says, it is not necessary to remember all the percentage figures as indicated at different ages. Until the child is 10 or 11 months old, at any rate, the proteid percentage is not less than one-third nor more than two-third of the fat percentage, and as the ratio of fat to proteid decreases with the increasing age of the child from 3 to 1⅛ one need not be at a loss as to the suitable modification for the infant at any age, and the impression that frequent changes must be made in the amount of food and in the percentages prescribed, he states, is a mistaken one. While it permits the exercise of great skill in adapting the foods to the needs, in particular conditions, it also admits considerable routine practice in the case of the healthy child. One must keep in mind the principle that except certain abnormal or diseased conditions, mixtures with the fat percentage ratio exceeding 3 should not be used continuously for any length of time, as they are not sufficiently nutritious, while mixtures in which the ratio is below 1½ needlessly tax the digestion and invite disorders. Directions are given for the use of whey feeding in some detail. In the case of the feeble infant a more detailed and elaborate study of the special needs of the child, in order to supply it with the food its condition requires, is essential instead of leaving the matter of the milk supply to the average milkman and the special modifications to the manufacturers of "patent" foods. The mixture usually required, if suitable milk is used, or analysis if the milk is known, may be computed by the working equations or reference to the feeding charts.

Miliary Tuberculosis of the Skin.—A. FILIA (H. Morgagni, Rivista, Aug. 4, 1906). A child while convalescent from measles had an eruption of about 50 little nodules on the upper and lower limbs. They were bluish, indolent, and desquamating. They slowly enlarged. Some softened with production of pus. Inoculation of this pus and of some of the nodules into guinea-pigs produced characteristic miliary tuberculosis. However, microscopic examination of the nodules showed neither bacilli nor the usual structure of tubercle, but only leucocytic infiltration. Injection of tuberculin into the child gave a slight reaction (a temperature of 99.3 deg.). There were no signs of visceral tuberculosis. The writer therefore thinks that the bacilli either were derived from some latent focus or were inoculated through a point of the skin and spread afterwards through the blood.

Treatment of Asphyxiated New-Born Infants with Infusion of Oxygen.— OFFERGELD (Centralblatt f. Gynakologie, XXX) The author has tried infusion of oxygen through the umbilical vein in 12 cases of asphyxiated newborn infants. Only 3 of the children were revived, and his opinion of the oxygen infusions is decidedly unfavorable. He is even inclined to regard them as responsible for extinguishing the last spark of life. He regards Schultze's swinging as not entirely free from danger, and is more favorably impressed with Ahlfeld's method of prolonged warm baths combined with artificial respiration. He states that it is sometimes astounding to witness the revival of the child after persevering continuance with this method for an hour or more.

A Case of Mastoiditis in a Boy of Thirteen Years, Operation Followed by an Attack of Purpura.—Wm. C. Braislin (Brooklyn Med. Journ., Oct., 1906). Alarming symptoms and the appearance of purpura followed three days after a mastoid operation, at which time likewise an adenoid operation was performed. Other attacks of purpura followed on subsequent dates. The patient lost a considerable amount of blood at this double operation, at the time when an acute inflammatory process was proceeding in the middle ear. The removal of a large mass of adenoids left an exposed area of considerable size, capable of absorbing septic materials. The considerable loss of blood and the absorption of septic material from the pharyngeal wound favored, if they were not directly responsible for, the purpuric attacks.

The writer has frequently advised against operating for adenoids during the presence of acute or subacute inflammation of the pharynx and tonsils, and believes that the source of anxiety in the above related case would have been avoided by postponing until later the removal of the pharyngeal hypertrophic tissue.

Meningitis Simulated by Symptoms Due to Ascarides.—Dr. Taillens (Archives de Médecine des Enfants, July, 1906). A girl, aged 21 months, had suffered from diarrhœa and loss of appetite for 4 days. For 2 or 3 weeks previously she had gradually become dull and ceased to play, preferring to be nursed. She was also restless and ground her teeth during sleep, which had not been before observed. On Mar. 29 she was seized with general convulsions which lasted half an hour. When seen for the first time some hours later she resisted examination and did not appear to be completely conscious. Since the convulsion she had thrice vomited food with bile and mucus. The tongue was white and the temperature 100.4 deg. She was ordered calomel and castor-oil with fluid diet and warm baths should the convulsions recur. During the day she had 9 more convulsions lasting from 20 to 40 minutes. She had also vomited several times but had no diarrhœa. The treatment was continued with a little potassium bromide. The convulsions had become almost continuous during the night and persisted on the following day. Between the attacks she appeared semi-comatose but could be roused by a loud voice and seemed to recognize her mother. The neck was rigid and the limbs contracted. The urine could not be collected but did not stain the linen, while the purgative produced a small fœtid stool without special characters. The temperature was 101.3 deg. Tepid packs and a small dose of chloral every hour were prescribed. On Mar. 31 the child was much worse and presented typical symptoms of meningitis. Kernig's sign was well marked.

The convulsions had ceased during the night. The neck was so rigid that an attempt to bend it forward raised the whole body from the bed, and there was rigidity of all the limbs. The coma had become deeper, the patient recognizing no one and taking no notice when addressed. The pupils were dilated with occasional momentary strabismus, convergent or divergent. There was general cutaneous hyperaesthesia, especially of the thighs and abdomen where a slight touch caused the child to cry, and the meningitic line could be readily produced. The child ground its teeth, sighed, and at intervals uttered a hydrocephalic cry, the cheeks becoming flushed and pale alternately. The temperature was 101.1 deg. The writer confidently diagnosed tuberculous meningitis. The dose of calomel and castor-oil was repeated. Next day the child was found sitting up in bed playing with a doll, and free from all symptoms except thirst. The previous evening she had passed a loose fœtid stool, containing 9 ascarides, after which she had slept well all night. She was ordered a dose of calomel and santonin on successive mornings, which brought away 39 worms, ranging from 6 to 10 in. in length. After this her progress was uneventful. The worms when crushed had a strong garlic-like odor, irritating to the nose and eyes.

Sleep for Children.—Cassel (Deutsche med. Wochenschrift, XXXII, No. 36). The author mentions among the minor aids for promoting sleep in children, a light turned low in the room. This takes away the dread of the dark and has a soothing effect on certain children. Knowledge of the prescence of a trusted person near the bed also promotes sleep, but the child should not be taken into an older person's bed. He cites a Swedish pediatrist of the eighteenth century, who estimated that, in Sweden, an average of 700 infants were smothered annually in the bed with mother or nurse. A warm bath, about 92 F., for five or six minutes before retiring, has generally a sleep-inducing tendency. It is especially grateful in the febrile infectious diseases, soothing the nerves. A wet pack to the trunk, the temperature about 77 F., when the child goes to bed, may also prove useful, or a cold rubbing down with water, not cooler than 75 F., with or without addition of salts. A tendency to masturbation should be combated by physical exercises, sports and playing in the open air until the child is so tired that he drops to sleep at once on going to bed. Cassel never gives drugs to combat insomnia, accomplishing the purpose by other means, except when a child is kept away by an annoying cough or convulsions.

Enlarged Veins in Children.—A. G. Gibson (Lancet, Oct. 20, 1906). Records have been kept by the writer of 14 cases showing visible venules together with dilated jugulars which behave abnormally on respiration. All these patients suffered from general debility, wasting and listlessness. Seven cases occurred in males and 7 in females. The ages ranged from 4 to 10 years. In 57 per cent. there was a history of tuberculosis in the family; visible veins on the chest were present in 92 per cent.; downy hair in 42 per cent.; a Eustace Smith retraction murmur in 71 per cent., and palpable glands in the neck in 64 per cent.

Fat Indigestion in Infants.—LOWENBURG (Medical Bulletin, Nov., 1905). The author gives some pertinent suggestions on diagnosis of fat indigestion and its treatment. He states that an excess of fat may not infrequently be a source of indigestion. These infants vomit from half an hour to an hour after feeding. The vomited material is sour, and has an odor of butyric acid. These are two practical points worth remembering when having a case of infant indigestion under observation.

This author further states that diarrhœa is a frequent symptom; although contrary to the prevailing opinion, constipation is not an uncommon feature. The stools are greasy and respond to the osmic acid test for fat, and oil globules are seen with the microscope.

The fat may appear in the stools as lumps not unlike those of Casein. A progressive loss in weight is sooner or later associated with this form of indigestion as in proteid indigestion. Fat indigestion is best prevented by starting the infant on low fat percentages, say one per cent. The increase should be gradual, and never reach above four per cent. It is advisable in the majority of such cases, says the writer, never to exceed four per cent.

In the active management of such a case, a calomel purge should be administered if vomiting is a permanent feature. The fat should be at once reduced to less than one per cent., and then only gradually and carefully increased, the stools and the conditions of the stomach being carefully watched.

These remarks of Lowenburg apply to the artificially fed baby and not to the breast fed baby that sometimes shows the effects of excess of fats in the mothers' milk by looseness of the bowels, sourness of the stools, and rapid gain in flesh, that practically amounts to a pathological state. The breast fed baby often suffers from a lack of fat in the mother's milk, being stubbornly constipated until some form of fat is given with each nursing. Usually one or two teaspoonsful of sweet, fresh cream with a very little sugar added will correct the constipation and the baby manifests no further digestive trouble. The food of the mother may be changed or rest from arduous labor enjoined to improve the quality of the breast milk and the nutrition of the child.

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ORIGINAL ARTICLES

THE MANAGEMENT AND TREATMENT OF SUMMER DIARRHEA IN INFANTS*

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It is a self-evident proposition in medicine, that in order to combat disease successfully a clear and distinct knowledge of the causative factors and the manner in which their evil effects are produced, is absolutely essential. It has been recently stated by competent authorities that little or nothing new has been added in the last decade to our better treatment of summer diarrhea in infants. If such is true it is perhaps owing to our want of a better conception of the forces at play. The matter to be discussed in this paper relates only to the management and treatment of the disease, but the why and wherefore of this will necessarily involve a brief consideration of the essential causes. Objection has been raised by some to the term summer diarrhea as misleading, and hold the view that the disease is entirely of germ origin, while others would have us regard the affection as purely an indigestion, when occurring in infants under one year of age. The truth is more likely to be found in a compromise between these two views. Undoubtedly the hot season is a potent factor in both directions as the vast majority of diarrheas in infants occur at this time of the year. A careful consideration of the operation of excessive heat on the one hand and bacteria on the other, as pathological factors will throw light upon the solution of the subject.

The human infant up to six months of age requires heat and heat-producing food for its successful growth and development; provided always that there is a normal means of disposing of the surplus heat by radiation and conduction by evaporation. In summer excessive and prolonged heat in combination with humidity of the atmosphere prevents the dispersion of the surplus heat of the infant economy. This in effect reacts upon the organism, causing a depression of the entire physiological functions, due to impairment of the already feeble thermo-toxic nervous mechanism. Heat from 6 deg. F. to 140 deg. F. favors the growth of bacterial flora. From 140 deg. F. to 212 deg. F. it destroys the germ and its spores. Heat rapidly increases bacterial growth in cow's milk, the usual food for artificial infant feeding. This may result in the production of a virulent toxine, as tyrotoxicon, or merely in the invasion of the lactic acid and bacillus causing acute indigestion. Bacteria indigenous to the intestinal canal such as the colon bacillus and streptococcus pyoceaneous may by symbiotic action become virulent. The Shiga bacillus is said to be present where there are clinical evidences of dysentery. Tyrotoxicon from decomposed cow's milk, a ptomaine developed from the growth of bacteria upon the albumins, causes severe symptoms of collapse. This toxine usually occurs when the animal heat of the cow's milk is allowed to continue indefinitely and is undoubtedly favored by the increased heat of the summer season. The other principally injurious bacteria are those of an acid producing nature, chief of which is the lactic-acid bacillus. This bacteria is now admitted to infect the very best of commercial cow's milk. Even when the number is small they continue to multiply in the infant stomach, causing the formation of the tough, leathery curd which defies the digestive capacity of the infant. These curds are likely to act as an irritant in the intestinal canal, generating gases producing colic and increased intestinal secretion. Other food besides cow's milk may become a carrier of infection. The commonest of this class perhaps are animal soups. These furnish an excellent culture medium even when well prepared, if kept for any length of time. They are especially apt to cause diarrhea when the meat of which they are made has undergone even the slightest decomposition from improper care or exposure, as the ptomaines formed are not affected in the process of cooking.

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*Read before the Northwestern Med. and Surg. Soc., N. Y., Feb. 20, '07

It is now well recognized that the normal gastric secretion containing hydrochloric acid can well dispose of most bacteria entering the infant stomach excepting, of course, the acid producing bacteria. But when through the depressing effect of excessive and prolonged summer heat upon the physiological functions and more especially upon the gastric secretion, where the amount of hydrochloric acid, normally small in comparison with that of adults is reduced, this disposing power is lost. A vicious combination of the bacterial flora from without with those indigenous within, which under normal conditions are harmless, render these latter virulent. This is what is now known as symbiosis. All varieties of summer diarrhea in infants are due in my opinion to the same primal cause, modified by the entrance into the intestinal canal of various pathogenic germs, and the development by evolution and symbiotic action of others indigenous to the intestinal canal, such as the colon bacillus, and the as yet undetermined class, in which may be placed that form we now recognize as the Shiga bacillus. That variety of summer diarrhea in infants formerly known as ileo-colitis I regard as due to pathological changes produced by the germ growth upon the intestinal tissues. The production of heat-stroke in infants may possibly complicate the clinical study of summer diarrhea. There is no reason why it should not be regarded as a distinct affection.

When we meet with the severer form of summer diarrhea where the system has become thoroughly poisoned by rivulent toxines, as in cholera infantum, we have an illustration of the extreme reactionary effect of summer heat upon the animal economy in the production of callapse with reduced or even subnormal temperature.

Management.—The term management in the title of this paper refers to the closest attention in the carrying out of details, and is regarded by the writer when applied to the summer diarrhea of infants as of co-equal important to therapeutic measures. In fact it may be shown later on to be more important. One great principle upon which too much emphasis cannot be placed, is involved in the management of this complaint, and that is rest—physical, physiological and mental rest. Rest for muscular action, in which is included the act of digestion and peristalsis of the intestines, rest for the blood circulation, and rest for the special senses. This object is secured by attention to diet, careful instructions as to its preparation and method of giving it, handling of the little patient, the observance of strict cleanliness to the minutest detail, and suppression of foul odors, keeping the body cool with baths and iced drinks, and an abundance of fresh air, and the maintenance of quiet.

In the consideration of the management of summer diarrhea in infants too much importance cannot be placed upon the idea wisely suggested by Kerley, of keeping the infant's digestion in order during that part of the year when summer heat cannot be reckoned as a factor. It is those infants whose condition all the year round is below the standard of health that are most liable to be affected by the influences of summer heat. Such are the rachitic and those whose tissues are flabby from poor digestion and assimilation.

If the view that excessive and prolonged heat combined with a humid atmosphere is a potent causative factor is kept in mind, it becomes more plausible why clinical experience has taught us that rest is the main principle and end to be gained in the management of the dietitics of summer diarrhea in infants. Normal infantile digestion has been shown to be more mechanical than chemical, in so far as only one article of food, milk, is used. Moreover, all of the physiological functions are like the individual itself—weak—and therefore are easily exhausted. Such being the condition it logically follows that in the use of food, and more especially an artificial one, the idea of conservation of vital force must be kept in view. As has been already said, the effect of excessive and prolonged summer heat is to depress and weaken to an undue extent the infant's physiological functions and nerve centers. When we consider the process of heat production from calorics of food in the human economy and the manner of disposal of the excess, much light is thrown upon the way indigestion occurs. Normally the overplus of heat generated within the animal tissues in the process of metabolism of food, which is not used as energy, said to be two-thirds of the total amount, is dissipated by the skin in the process of radiation and conduction by evaporation. Now if the external temperature surrounding the body be as high as the normal body temperature and there is a humid atmosphere it must follow that there will be no radiation and very little evaporation. Hence the temperature of all the body tissues will of necessity be raised above the normal which for all pathological purposes acts the same as fevers.

The first effect of this condition is unquestionably to lower the innervation of those tissues whose peculiar function is to preside over the process of digestion and assimilation of nutrition. This condition of lowered vital activity greatly favors indigestion of food that is ordinarly easily digested, by causing exhaustion of muscular energy of the gastric walls as well as altered state of its secretions. It thereby favors increased bacterial growth and production of toxines which reacts upon the food ingested and at the same time upon the nerve centers, disturbing the influence of the latter upon the entire animal mechanism and as a result diarrhea occurs. In one way and another all of the internal organs finally become involved, most markedly the liver and kidneys and the circulatory apparatus to a more or less extent.

It is therefore incumbent upon the physician after the disturbance of summer diarrhea has become manifest to place the little patient in a condition of complete and perfect rest, which, as may be readily understood, is in itself the dynamic antagonist of heat production. When the ordinary food is entirely suspended or given in a much diluted form we aim to accomplish this end by giving the digestive tract the lowest possible amount of physiological work to perform. The idea that the change of food from proteid and fat to carbohydrates solely, reduces the amount of bacterial growth may be in a measure true. but the more rational explanation that it aids the weakened mechanism to perform its task in an easier manner with less expenditure of energy, is much more acceptable to our intelligence. In this connection the question of nutrition, in view of the rapid loss of weight and shrinkage of tissues becomes a most important subject for consideration.

We are brought face to face with the question whether to continue giving food which serves as fuel in further maintaining the disturbance, or of withholding it entirely until the functions of digestion can be restored to their normal state. It is fairly reasonable to infer that this rapid wasting is due to a drainage of the liquid elements of the blood and tissues into the intestinal canal; though fat tissue is consumed at the same time. This is most apparent on the inner and upper thighs. It is for this reason that if food is given at all, it should be of the easiest digestible character, with no requirement on the part of the normal functions for chemical changes, also that it should furnish a poor culture medium for bacteria. Such a food when used in entirely moderate quantity is found in starch, provided always that it has previously been subjected to the chemical changes of heat. We know that starch in the raw state cannot be converted by the secretions into sugar, but as a food for infants suffering from summer diarrhea it requires something more than the degree of heat sufficient to burst the cellulose envelope of the starch cell. In whatever form starch is used for feeding these infants, it should be subjected to a temperature high enough and long enough in duration to convert it into achröodextrine, which on contact with saliva is instantly changed into maltose or grape sugar. Sugar is readily assimilated and provides a poor culture medium for the lactic-acid bacillus which may be said to be always present where milk has been previously used.

(It has been demonstrated by competent authority that the food which Nature supplies for tropical diet, viz., fruits and cassava, is one consisting chiefly of carbo-hydrate elements, as the fats and proteids are not congenial to tropical needs.)

For the reasons just stated, the first and absolutely most necessary step in the management of every case of summer diarrhea in infants, whether breast or bottle-fed, is to stop the nursing and change to either pure water, filtered or boiled, or a weak food such as toast water, barley water, rice water or a very thin gruel of browned flour, called by the Germans meal-soup. Meal soup is prepared by browning two tablespoonfuls of good wheat flour in a clean frying pan, with continual stirring. A pint of equal parts of milk and water is brought to a boil and a heaping tablespoonful of the browned flour blended with water added and stirred in. The mixture is then removed from the fire. Toast water is made by pouring boiling hot water over a couple of slices of stale wheat bread that have been evenly toasted on both sides over the fire and placed in a deep bowl that will contain a quart. The toast should be covered by the hot water and then allowed to remain until cool. The supernatant water is afterwards poured off into a clean vessel without disturbing the toast. Barley water and rice water are made with the whole grain and should be kept boiling for not less than one-hour. If allowed to stand in a high vessel until cool the supernatant water can then be poured off into a milk bottle until wanted. Whatever form of food is given, the quantity should be small—from two to four ounces at a time at intervals of every one or two hours. The great principle involved is to use a diluted food or none at all, in order to give the digestive functions a rest. After a lapse of 24 to 48 hours, according to the condition of the patient, Kounigs, matzoon or Kefir can be used, also lacto-somatose, arrowroot or the boiled flour ball. All of these are to be carefully given in moderate quantity and the effect upon the bowels closely watched. Return to either pasteurized or breast milk should be gradual in severe cases. As absolute rest and entire quiet is the essential object, the child if not kept in bed should lie on a pillow in the mother's lap or in her arms when carried about. No tossing nor patting of the child should be allowed. Rubbing of the abdomen to relieve pain is also harmful as it only tends to excite peristalsis of the bowels. The same may be said of all external applications. Attention to environments is to be reckoned of the highest importance. Mothers should be warned and instructed to practice cleanliness to the minutest detail. This applies with especial regard to the prevention of the use of "comforter nipples," or fruitless nursing; also to the care of the nipples, whether human or rubber. A simple wash of boric acid solution for these is far preferable to washing out the baby's mouth. It is almost needless to suggest that the nursing bottles should be thoroughly cleansed with boiling water after using, and not be allowed to stand about with contained remnants of food. The clothing should be clean, light in weight and porous to air. In fact a single garment is sufficient on warm days, and the infant will be observed to appreciate this as a mere comfort. Above all, mothers should be impressed with the great value of a bountiful supply of fresh air, both day and night. Every plan to secure this end should be devised by the suggestions of the attending physician, such as early morning walks in parks, water excursions, outdoor living in tents on open grounds, or on the roofs of houses or even on fire escapes. These tents may be simply and cheaply constructed, open at the top with a covering like an awning to protect from rain and dew, allowing an open space of a foot or more between the walls and the covering. The child could sleep in the tent during the night, using the baby carriage as a bed where economy was an object. Demand for an abundance of fresh, cool air in the management of summer diarrhea, needs no argument. It is a *sine qua non*. Without it all therapeutic measures in severe cases are virtually useless. I believe that crowd-poison is one of the most effective contributing factors in the production of summer diarrhea in infants. From statistics kindly furnished me by Dr. Darlington it appears that the death rate from this complaint in infants under one year of age has been wonderfully reduced in the last fifteen years in the Old city of New York. Out of every 1,000 deaths occurring in the months of July, August and September those occurring under one year of age were reduced from 170 per 1,000 in 1892 to 85 per 1,000 in 1903. And yet in 1904 and 1905 there was a sudden increase to 102 and 105 per 1,000 respectively. This has been ascribed by Dr. Darlington to the general influence of an increased virulence of all infectious diseases prevailing for these years. I am rather inclined to think that a most careless observance of such important sanitary laws, as ventilation, etc., by a large influx of newly arrived emigrants of an inferior class for those years, crowding into already densely populated districts, would be a more likely explanation of this strange increase.

In preaching the doctrine of cleanliness to mothers they may be induced to employ baths, either cool or tepid, for their infant. These also aid in overcoming the heat effect of the summer temperature. No possible harm can come of this practice in the management of summer diarrhea when the infant is over three months of age and there are no signs of impending collapse. Especially is this true if a certain amount of friction with the hand is used while the patient is submerged. This helps to excite capillary reaction. I would advise a temperature not lower than 70 deg. F. A tepid bath at 102 deg. F. will often cause a sensation of relief from heat better than one of a lower temperature. Besides giving cold water liberally as a drink, pellets of ice may be freely given. Ice often helps to quiet nausea and vomiting.

Therapeutic Indications.—Clear out the intestinal canal, check fermentation and eliminate toxines. In mild or severe cases, whether from a feeble state of digestion induced by excessive heat, or the ingestion of food infected by foreign bacteria the first indication is best met by the administration of a promptly acting cathartic. Castor oil is liked by many, as its action is limtied to the production of one or two stools only. But in many cases where the stomach is sensitive, as often happens, it is ejected. The same may be said of magnesia sulphate and Rochelle salts, which latter was a favorite remedy with Trousseau for adults. A more elegant and readily acceptable remedy is calomel in tablet form. When given in fractional doses of 1-10 of a grain repeated every half hour or hour it acts as promptly as castor oil, at the same time appearing to have a more extensive therapeutical effect. This may reasonably be attributed to its action upon the liver, and perhaps also its action as an internal antiseptic. It has always seemed to the writer that calomel manifested a cholagogue action, though this has been denied by such eminent authority as Rutherford of Edinburgh, whose experiments were performed on dogs with large doses. Certainly in fractional doses of 1-10 grain it is possible that calomel may be converted by the hydrochloric acid of the gastric juice into the bichloride, which Rutherford admits to be a typical cholagogue. Whether its antiseptic action is due to the chemical change in the stomach or to its secondary effect in increasing a flow of bile is a matter of speculation. But further than this, its remedial effect in diarrhea can be placed on purely physiological grounds. In any disturbance of the intestinal canal due to irritation, the blood circulation in that part is necessarily increased, and a drug that will by its elective action like mercury stimulate the cells of the liver, which is the great compensatory organ of the abdominal viscera, to increased activity, will equalize the portal circulation by inviting the excess flow from the intestines to that organ. For this reason

1-10 to 1-20 gr. doses of calomel at three or four hours intervals may be continued often with excellent results.

Where there is high fever with vomiting and restlessness and other chemical signs of a toxic nature, a most useful method of clearing out the large intestines is by means of irrigation. This may be performed in a cleanly and effective way by the use of the double tube of Kemp with a normal saline solution at 70 deg. F. (ʒi of chloride sodium to the pint.) The reservoir containing the fluid need not be held more than 3 feet above the patient. Not only does irrigation clean out the lower intestines which are liable to become the foci of pathological changes such as are found in entero-colitis, but at the same time it reduces temperature and replaces a certain amount of fluid to the blood and tissues which has been lost through frequent intestinal discharges. It has also been shown by Thompson and others that it flushes the kidneys, which it is now well known are quite likely to become congested through the action of toxines absorbed from the intestinal canal into the general circulation. There are some cases, however, as those of true cholera infantum, where in my experience hot irrigations at 112 deg. F. appear to have a far better effect in restoring the equilibrium of the general blood circulation and preventing lesions of the intestinal mucous membrane. Where vomiting is persistent, washing out the stomach may prove effective, but the performance of the operation sometimes causes so much resistance that it excites both patient and relatives to a high degree.

Check Fermentation.—In every case of summer diarrhea in infants, whether mild or severe, an intestinal antiferment would seem to be clearly indicated. The main point is to select one of this numerous class that will act rapidly without adding to the gastric irritation. Bismuth and its salts, the subnitrate subgallate or salicylate, fulfils this requirement and may be accepted as the type of intestinal antiferments. It has been my experience to find moderate doses of the preparation of bismuth—5 to 10 grains—fully as effective as larger and bulkier ones. I prefer to give it suspended in a mucilage of either tragacanth or acacia flavored with peppermint or cinnamon and combined with a fractional dose of mercury with chalk, ⅛ gr.

Bichloride of mercury is certainly a most reliable internal antiseptic. I have found it to be of especial value, when given in doses of 1-100 grain in cases where the stools are of a dysenteric character. If it should eventually be confirmed that all summer diarrheas of infants were in reality dysenteries caused by the Shiga bacillus, then no better internal remedy need be sought than bichloride of mercury.

Lactic acid in 1 to 5 drop doses diluted with water and repeated every two hours has been found highly beneficial where fermentation would appear to be due to the lactic acid bacillus, viz., where the stools are very green and excoriating. It is probably owing to this fact that the buttermilk treatment is becoming so popular in Germany and France. One drachm of wheat flour is advised to be added to one pint of buttermilk and gradually heated to a boil, stirring continuously. It is fed in ℥ſs. quantities, gradually increased.

Carbolic acid (C.P.) in ʒi doses of a one per cent. and two per cent. watery solution will also be found most useful both as an antiferment and as a gastric sedative. Strange to say, however, there are idiosyncrasies where the vomiting is apt to be aggravated. The dose should be repeated every two hours. It can be said in favor of the use of carbolic acid solutions that they are nature's own antiferments, being evolved in the process of normal intestinal digestion as pointed out by Gillespie in his work on Digestion.

Elimination of Toxines.—It will readily be understood that in our efforts to clear out the intestinal canal and check fermentation by the employment of such remedies as also influence the physiological functions of the liver, as the mercurial preparations for instance, we at the same time in a measure aid in eliminating from the circulation the toxines that cause fever, convulsions and death. It is now one of the accepted dogmas of medicine that the liver is the paramount organ for destroying toxines in the animal economy. It is in fact the great alembic of the human anatomy and is our chief reliance for burning up, as it were, toxines. Besides the liver, however, the kidneys may also be called into play, and this is most easily and simply accomplished by intestinal irrigation with normal salt solution. For not only does intestinal irrigation

tion the large loss of fluid from the blood, ejected in the stools, but, as before pointed out, it simultaneously flushes out the kidneys, that in themselves are most likely to be implicated in the general toxemia. The application of the principle of rest in regard to treatment in the controlling of intestinal peristalsis with opiates would appear obvious, and to my mind is good practice if used at the proper time and for the additional purpose of the relief of pain, which is the enemy of rest. After the intestinal tract has been thoroughly cleared out, the food restricted to weak carbo-hydrates, and there is pain and loss of sleep, I do not hesitate to administer 5 to 10 drops of the camphorated tincture of opium as a single, dose, or the hypodermic injection of 1-100 grain of morphine. I would not, however, leave opiates in the hands of the nurse to be given in repeated doses, for I believe they tend to prevent elimination. For a similar reason the use of astringents should be deferred until the acute stage has passed, there can be no possible doubt of their usefulness. Tannigen may be regarded as the type of astringents, though Trousseau was fond of the use of Krameria. Kino has also done good service. For special symptoms and complications, ⅛ drop doses of wine of ipecac, 1-10 grain of cocaine hydrochlorate, or ½ grain of chlorotone will be of genuine service in controlling obstinate vomiting. Hypodermic injections of three drops of a ten per cent. watery solution of chloral hydrate or three drops of sulphuric ether produce wonderful results in the collapse stage of true cholera infantum. The following formula is traditionally famous in the same condition:

℞

Ol. Anisi
Ol. Cajeputi
Ol. Juniper, ua fzifs
Ether Sulph. fzis
Liq. Acid Halleri, fzfs
Tz. Cinnam. ftb℥ii

S. One drop every 15 minutes in sugar water. The Liq. Acid Halleri is composed of 1 part of sulphuric acid to 3 parts of alcohol.

In the condition of acute cerebral anemia commonly termed in the books hydrocephaloid disease, I have found an easily assimilated preparation of iron, such as the Potassio-tartrate, contained in the wine of iron, to be positively useful. For the condition of furunculosis following summer diarrheas, and in fact as a good nutrient tonic during convalescence I can safely recommend the syrup of the lacto-phosphate of lime. Alcohol in the form of good brandy, whiskey or sherry wine is certainly useful when signs of exhaustion appear. It should be remembered that alcohol is present also in the fermented milk, as Koumys, etc. An excellent substitute for alcohol alone may be found in liquid peptenoids, which contains sherry wine. Finally, as to the serum treatment of summer diarrhea in infants, I have only this to say: I do not believe the bacteriological case for all forms of this complaint yet proven, and if future work along these lines should place my judgment in error, I would not even then be willing to rely upon the serum treatment alone as a means of cure. It does not appeal to my medical sense of reason.

THE ETIOLOGY, PATHOLOGY, SYMPTOMS, AND TREATMENT OF INFANTILE PARALYSIS.

By Herbert W. Moxon, B.A. (Cantab.), M.R.C.S., L.R.C.P.,
Matlock.

The term infantile paralysis is applied to a disease of acute or sudden onset, occurring commonly in young children, and characterised by a purely motor paralysis of a flaccid type, without any alteration in sensation, but usually followed by subsequent wasting of the part affected.

It will at once be seen that this definition confines the term infantile paralysis to a paralysis of spinal origin, the paralysis of cerebral origin being classed as infantile hemiplegias, which present clinically quite a different picture.

ETIOLOGY.

Several interesting and important points are brought out in an investigation into the etiology of infantile paralysis, and the following are the more important etiological factors concerned in its production:—

Age.—Ninety per cent. of acute cases occur during the first decade, and by far the greater number during this period occur during the first three years of life, the majority during the second year. After the end of the third year, the disease becomes less frequent, and after six years, it may be considered rare: cases, however, do occur both in adult life and in old age.

Acute Specific Fevers.—The second most important etiological point, in connection with infantile paralysis, is its relation to the acute specific fevers. It has been observed to follow scarlet fever, measles, whooping-cough, diphtheria, and also pneumonia, and the relationship is too intimate to be considered merely as accidental.

Cold and Exposure.—Exposure to cold and damp appear to be, at any rate, predisposing factors, and some cases have been observed to follow traumatism.

Seasonal Relationship.—There is a very definite relationship between the season of the year and the time when this disease is most prevalent. It is commonest during the hotter months of the year, especially during July and August, the curve showing a strong rise towards the end of May, reaching a maximum in August, and descending somewhat abruptly during November. A further most interesting fact in connection with the etiology of this disease is its occasional occurrence in epidemic form, Strümpell and Marie first suggesting an infective origin for the disease. Numerous outbreaks have been reported from different parts of the country from time to time, other parts of the same country being, at the same time, practically free from the malady. In this connection, Dr. Pasteur has reported a very interesting series of cases occurring in the same family, in which two members had definite attacks of anterior poliomyelitis, a third an attack of hemiplegia, two others had definite febrile symptoms without any paralysis, and two more had certain nervous manifestations which passed off rapidly in a few days. All the children were taken ill within a few days of one another, and the different clinical manifestations were, in all probability, the outcome of a similar primary infection. No specific organism has, however, hitherto been isolated. Sex appears to exercise no influence upon this disease, statistics showing that it occurs equally in either sex.

PATHOLOGY.

The essential lesion in infantile paralysis consists of an atrophic destruction; more or less complete, of the large motor cells in the grey matter of the anterior horn of the spinal cord, usually affecting either the cervical, or lumbar enlargements, and more commonly the latter, but the exact pathology of the lesion, and the precise manner in which this destruction of anterior horn cells is brought about, are at present more or less *sub judice.* All observers are agreed that the vessels of the affected areas are thrombosed, and that there are signs of inflammatory reaction around them, but the question, as to whether such thrombosis is a primary or secondary condition, is one upon which opinions differ. The view at present most widely accepted is that the disease is infective in origin, and that the changes which result are inflammatory in character, and the fact that the disease is most common during the hot period of the year, that it occurs at times in epidemic form, and its intimate relationship to the acute specific fevers, are all facts which go far towards establishing its infective origin. On the other hand, it must be admitted that there is much to be said in favor of the process being dependent upon a primary thrombosis of the vessels. The rapid onset of the paralysis is much more like a vascular than an inflammatory lesion. The limitation of the destructive process to the area of the cord, supplied by a branch or branches of the artery of the antero-median fissure of the cord, and the marked resemblance of the pathological appearances presented by the lesion—viz., multiple extravasations and subsequent softening—to the condition found in the brain after thrombosia of the smaller cerebral vessels, are all points worth careful consideration from the point of view of a primary thrombosis of the vessels being the chief cause of the lesions found. Further, the absence of any obvious leucocytic changes tends somewhat to support the theory of a primary thrombosis, and also the wide distribution of the paralysis, at the onset, is easily accounted for by the vascular disturbance taking place in the artery of the antero-median fissure, which supplies the whole of the anterior horns, and the fact, that smaller areas of thrombosis are found at different levels, is only what might be expected as a result of the retardation of the blood stream in the vessel; and again, the fact, that the lumbar region of the cord lies at a point most distal from the blood supply, might explain why this region is most frequently affected.

It is outside the scope of this paper to enter into the minute histological pathology of this lesion, but a few of the more important facts may, with advantage, be briefly summarised. During the acute stage, the surface of the cord and its membranes presents no abnormal appearances, but, on section, the grey matter of the anterior horns is deep red in color, and is found to be softened and engorged. The focus of distribution is generally most acute at one spot; usually in the lumbar region, and from this focus the congestion extends for a variable distance. Microscopically, the process is seen to have a far wider distribution. The vessels of the anterior horn are, as has already been mentioned, thrombosed, and usually show signs of endarteritis. In the region, where the lesion is most acute, few, if any, nerve cells can be detected, whilst at the point, where the lesion has been less acute, the anterior horn cells are seen to be swollen, and, in the later stages, show degenerative changes. In an old case, the anterior horns can be seen to be much reduced in size, and there is a marked increase in the neuroglia. No nerve cells, or fine medullated nerve fibres, can be seen in those situations where the process has been most acute. In addition, the anterior nerve roots are secondarily affected with degenerative changes, and later undergo atrophy, and, in the acute stages, the peripheral nerves also show signs of degeneration, and, in some cases also, degenerate nerve fibres, probably endogenous in origin, can be seen scattered throughout the antero-lateral columns of the cord, and, occasionally, even in the posterior columns as well.

Any account of the pathology of infantile paralysis, however brief its character, can hardly be considered complete without, at least, a passing reference to the changes which take place in the affected muscles. These undergo rapid atrophy, the individual fibres becoming gradually smaller and smaller, but they always retain their transverse striation even when their atrophy has proceeded to an extreme degree. The fibres rarely show fatty degeneration, though there if often an increase in the interfibrillar fat. It is also interesting to note that, even though a muscle may show an extreme degree of atrophy, normal muscle spindles, supplied by perfectly normal nerve fibres, can always be detected, the nerve fibres supplying them, arising from the posterior roots.

SYMPTOMS.

Three stages can be observed clinically in a case of infantile paralysis, and these are as follows:—

1st stage, or the stage of fever, obvious illness and paralysis, this stage usually lasting any time up to a fortnight.

2nd stage, or the stage of gradual improvement. This stage is reached when the acute febrile symptoms have subsided, and the transient paralysis, which may have affected all four extremities, and, in some cases, even the muscles of the trunk, has cleared up, leaving certain muscles of one or more limbs paralysed.

3rd stage. This is sometimes called the chronic stage, and is reached, when there is no further atrophy or recovery of power in the affected muscles. It is in this stage that deformities are so liable to make their appearance.

In addition, some authorities describe an intermediate, or stationary period between the first and second stages described above, lasting any time up to four weeks, during which rapid muscular atrophy is taking place without any visible signs of recovery in the affected muscles.

The onset of an attack of acute anterior poliomyelitis is sudden, and, as a rule, there are no prodromal symptoms, the exact mode of onset is, however, by no means always the same. In a large number of cases, the child goes to bed perfectly well, and wakes up during the night, often screaming with pain, and, if old enough, the little patient may be able to indicate that the seat of the pain is in the back, or in one or other limb. The child resents all interference with, or movement of, the limb, the temperature is raised, vomiting may occur, and there is marked general malaise. Convulsions may occur at the onset.

Another possibly more common clinical type of onset is that in which the child is taken ill with slight febrile symptoms, headache, vomiting, and possibly diarrhœa, and some pain in the back, and, after being kept in bed for a day or two, it is noticed that one or more limbs are paralysed. It is during this stage, that the diagnosis is frequently overlooked, and the case often considered to be one of rheumatism, rickets, acute osteomyelitis, or even some cerebral lesion. Another form of onset is described by some authors, in which there is a rapid, or, in some cases, gradually progressive paralysis, without any marked constitutional symptoms being present, but this mode of onset is not the usual one in children, but is more frequently seen in the adult type of infantile paralysis. It is now necessary to consider the symptoms of this lesion in rather more detail.

Temperature.—The temperature generally rises pretty rapidly to 102 deg. F. or 103 deg. F., and usually returns again to normal by the end of the first week. In some cases, however, it may remain high for a considerably longer period, especially if pain on movement still persists in the affected limb.

Pain.—Pain is commonly present at the onset, but generally passes off within a few days, so that the limb or limbs can be passively moved without giving rise to any pain. It varies considerably in degree in different cases, and its situation depends largely upon the site of the lesion. As this is usually in the neighborhood of the cervical, or lumbar enlargements of the spinal cord, pain is usually present either in the neck, or lower part of the back, and there may be some muscular rigidity in these situations. The pain is generally also referred to the affected limbs.

Sensation.—Although pain is often referred to the affected limb, no alteration whatever in either light or deep touch can be detected.

Paralysis.—In the earliest stages, the paralysis often passes undetected, but can always be found, if careful examination is made, with a view to its recognition. The extent of the paralysis usually reaches its maximum within 24 or 48 hours from the onset of the first symptoms, and, in some cases, in even a shorter time. The distribution of the paralysis at the outset is variable, and may, in some cases, be very extensive, though the ultimate seat of election is undoubtedly the lower limb; in the majority of cases, the muscles most frequently affected being those of the anterior tibial, or extensor group. The amount of the paralysis during the acute stage is always in excess of that found at a later date, and may be, as has been already mentioned, very extensive. In severe cases, the paralysis may at first affect all four limbs, and even the thoracic and abdominal muscles as well, so that respiration may be carried on by the diaphragm alone. Within a week or two, however, the general paralysis, if present at the outset, usually clears away, and the residual paralysis is generally found to be limited to one or more limbs, or it may even be to a single muscle, or group of muscles. Such groups are invariably muscles of associated function. The lower limbs are more frequently affected than the upper, as has been already noticed, and, whilst a paraplegic distribution of the paralysis is common, a hemiplegic one is exceedingly rare. In some cases, the paralysis may be confined to one limb from the commencement.

The paralysis rarely extends to the cranial nuclei, but cases, in which the muscles of the face were affected, have been described. The sphincters also are rarely affected, but, when the lesion is extensive and involves the lower sacral region, both sphincters may be involved.

The paralysis is always flaccid in character, and there is a complete absence of tonus in the muscles affected, but it is an interesting point to note that there is sometimes a certain amount of rigidity in groups of muscles, represented by segments in the cord adjacent to those actually involved in the lesion.

Reflexes. Muscular Wasting. Electrical and Trophic changes.—During the first or acute stage, the reflexes, both superficial and deep, are lost in those parts of the body that are affected. Wasting of the muscles can usually be detected within a fortnight, but it should be remembered that the atrophy, which the muscles undergo, is not always obvious, and that often, in fat infants, very little difference in measurement between the two limbs can be detected, although the one is flaccid and the other is firm and moved in a normal manner. Conversely, it must be remembered that, if the disease occurs at the time when an infant is beginning to lose its excessive fat, an exaggerated estimate of the amount of muscular wasting may be made, if this factor is not taken into account. Electrical examination during the second stage of the disease shows the presence of the reaction of degeneration, *i.e.,* the muscles react very slightly, or not at all, to faradism, but give a brisk response to the galvanic current, the A.C.C. being greater than the K.C.C. Fibrillary tremors are occasionally to be noted in connection with the muscles, but are not common.

The temperature of the affected limb is markedly lowered even in the early stages of the disease, the limb is usually of a bluish color. The difference in temperature between the two limbs, in cases where one only is affected, is sufficient to be readily detected by the observer's hand, amounting in some cases to several degrees. In old cases, further evidence of trophic changes can be seen in the bones, which become thinner than normal, and in the skin, which generally remains of a bluish color, very smooth and very loose on the subcutaneous tissue. The hair of the limb remains normal, and it is stated that the erector muscles of the hairs are unaffected. During the second stage of the disease, although atrophy of the muscles is in active progress, return of power is also taking place in them. Those muscle fibres represented by cells in the cord, which have become hopelessly destroyed, undergo rapid atrophy, whereas those cells, which have not been irreparably damaged, undergo recovery, with a corresponding recovery of those muscle fibres which they represent. In some cases, the recovery of muscular power is comparatively rapid, and there may be a fair degree of recovery, within two or three months, whilst in other cases it is a much more gradual process, and may be prolonged over a year or more. After two years have elapsed, very little further improvement is to be expected. During the third stage of the disease, when no further atrophy or recovery is taking place in the affected muscles, the knee jerk is absent or present according as to whether the quadriceps extensor muscle, and especially that portion of it formed by the vastus internus, is or is not involved in the lesion. During this stage, also, the electrical excitability is so diminished in the paralysed muscles that they usually react to neither faradism nor galvanism.

Deformities and their Production.—During the second stage of the disease, the deformities, so often seen in connection with infantile paralysis, begin to develop, and the process once started may go on almost indefinitely. The cause of the production of deformity has been a matter of some dispute, and it is generally ascribed to the tonus which is present in the unaffected muscles; some authors attribute it to the force of gravity, together with the organic contraction, which occurs in the affected muscles, and to the lack of development in the muscles and tendons whilst the osseous structures continue to grow in length. There is no doubt that all these factors have their influence, but in the deformities, produced in the earlier stages of the disease, it is certain that the most important factors in their production are the group, or groups of muscles affected, and the extent of their implication, together with the effect of "tonus" in the normal or only partially paralysed muscles.

This fact is well illustrated in the contrast there is between a case, in which all the muscles below the knee are paralysed, and one, in which only one group is affected. In the former case, there is simple placidity of the limb with little or no actual deformity, whilst in the latter, there is well-marked talipes, equinus or calcaneus, according to whether the extensor or flexor group of muscles is paralysed. In some cases, an arrest of development occurs in the affected extremity, one limb, after a few years, being shorter than the other. In these cases, spinal curvature is liable to develop, or this condition may also result from a primary unilateral involvement of the erector spinæ muscle.

Following on the flaccidity of the muscles, secondary changes may take place in the joints, the ligaments stretch, and the joint tends to fall away from its socket; this is especially well seen in the case of the shoulder joint, and the head of the humerus can sometimes be felt to hang below the glenoid cavity.

The disease now remains stationary, and, in some cases, for life, but it is extremely interesting to note that, in some cases, progressive muscular atrophy has developed later, either in the extremity originally affected, or in one of the previously unaffected limbs.

TREATMENT.

With regard to the treatment of infantile paralysis, it must be admitted that, in many cases, judging by the after effects, the treatment usually adopted cannot be considered wholly satisfactory. One morning spent in the orthopædic department of any large general hospital will convince the most casual observer of this fact. The course most commonly adopted at present is more or less as follows. The child is kept in bed for a variable period, till all febrile and constitutional symptoms have subsided, and after a longer or shorter period, and more often the former, finds its way into the hands of the orthopædic surgeon, who is now its only hope, more or less hopelessly crippled. It would be unworthy to disparage in the slightest degree the work of the orthopædic surgeon, whose results can frequently only be described as brilliant, but from the patient's point of view they can hardly be described as altogether satisfactory, often involving a very prolonged course of treatment, including, in some cases, repeated operative measures, and the use of mechanical appliances, which often cause the patient great discomfort. The treatment of the deformities, so often seen in connection with infantile paralysis, is outside the scope of this paper, and it is, in the second stage of the disease, after the subsidence of the acute febrile symptoms, and during which a variable amount of recovery in the affected muscles is taking place, that all one's efforts must be devoted towards neutralising, so far as possible, the after-effects of an attack of acute anterior poliomyelitis.

At the onset of the disease, the treatment is practically that of an acute febrile attack, little or nothing can be done to cut short or modify the actual lesion. The child must be kept rigidly in bed, and as quiet as possible. A milk diet must be adhered to, the bowels kept open by means of mild laxatives, and measures taken to ensure the child obtaining a requisite amount of sleep. A cradle should be used to keep the bed clothes off the lowe, limbs, for, if the nuclei of the extensor nerves are chiefly affected, their weight, acting upon the toes, will accentuate and increase clear the lower bowel of bacteria and replace by rapid absorpthe effects of any extensor paralysis which may exist. During this stage, a light leather or poroplastic splint, rectangular in shape, may with advantage be used in cases in which the lower limb is affected, in order to keep the foot at right angles to the leg.

If pain is a prominent symptom in this stage, it may be treated by the application of hot fomentations, leeches, or by counter-irritation. It is of the first importance, during this early stage, that the limb should be kept thoroughly warm, and this can be best effected by bandaging it lightly over cotton wool, and, if necessary, hot-water bottles may be used, but if they are, care must be taken, as on account of the vasomotor disturbance which exists, if any burn should result, it will be slow in healing.

As soon as the acute stage has passed off, and the pain and constitutional symptoms have subsided, there are four chief aims to be kept in view with regard to treatment, viz.:—

1. To ascertain, so far as possible, the exact extent of the damage done.

2, To anticipate, and prevent, so far as possible, the advent of any definite deformities.

3. To maintain the nutrition and tone of the muscles of the limb, and especially the unaffected ones.

4. To train, or it may be to re-educate, the child in the use of the injured limb under its new conditions, in such a way as to gain the maximum amount of benefit from the action of unaffected, or only partially paralysed muscles, and also to train them, so far as is physiologically possible, to take the place of those muscles which are functionless.

Of these four aims, the last must be considered the most important, not only intrinsically, but also from the fact that, in its accomplishment, the third aim is also most effectively secured; since there is no external stimulus which can be applied to a muscle in order to maintain its tone and nutrition, at all comparable with the stimulus, which reaches it from the central nervous system by means of its own nerve.

The satisfactory determination of the exact amount of permanent damage, which will result in any given attack of anterior poliomyelitis, is by no means always an easy matter. The period of acute febrile disturbance is followed by an interval, to which succeeds a period of gradual improvement, which lasts for a variable length of time; and it may sometimes be six months before the exact extent of the final paralysis can be fully and precisely ascertained, but, in the majority of cases, a very fair estimate may be obtained, within a very much shorter period, by a careful investigation of the electrical reactions of the muscles of the affected limb.

Should an early commencing deformity be detected, a suitable light leather, or poroplastic splint should be worn at night, in order to correct it so far as possible; and, during the day, as soon as the child attempts, or is trained, to use the affected limb, careful watch must be kept to prevent it from using it in such a way as to increase the tendency to any particular deformity in course of development.

As soon as the acute symptoms have subsided, and all pain disappeared, massage and passive movement should be instituted, and, of the two, the latter is the more important, resistance movements being especially valuable. Massage once a day, and passive movement at least three times a day, should be carried out with the utmost regularity. With regard to the use of electricity in these cases, it is sometimes of great value, but the benefits, which are said to result from its use, have possibly been somewhat over-estimated, and there is a risk of over-stimulation of the unaffected muscles, which may tend to increase any developing deformity. In cases, in which the muscles react to the faradic current, benefit often results from its use, and if over-stimulation of the muscle is avoided, no harm is likely to result.

In those cases, in which the muscles react only to the constant current, one great difficulty often arises. The majority of children strongly object to its use, and, while they will often stand a faradic current strong enough to send the observer's muscles into tetanus, they will often not tolerate a galvanic current sufficiently strong to produce muscular contraction, in which case no object is gained by its use. In short, each case must be judged on its merits with regard to the use of electricity. During this period, the general health of the child must be attended to, and the use of tonics, of which strychnine is perhaps the best, may, with advantage, be administered.

As soon as possible, the training of the child in the use of the affected limb must be commenced, in the same way as, after the surgical treatment of the deformities which may result later, the patient has to be taught the proper use of his restored foot. It is by this latter means that the greatest hope probably lies in preventing, or neutralising the complicated deformities so often seen as an after-result of infantile paralysis. That such a process requires time and unremitting patience cannot be denied, and, it must be admitted, may in some cases be impracticable, but, if efficiently carried out, it will often meet with success, and even if the results are disappointing, and the case ultimately require surgical measures, the surgeon will find a fairly satisfactory limb upon which to work, and moderately healthy muscles, into which to transplant his tendons, instead of, as is so often the case, a more or less hopelessly withered limb, the responsibilities for which are shared partly by the effects of the infantile paralysis, and partly by disuse atrophy.

THE CARE OF THE THROAT, NOSE, AND EARS IN CHILDREN.[1]

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"The loss which the Commonwealth suffers by the destruction of its youth is like the loss which the year suffers by the destruction of spring."—Pericles.

As we are all aware, the struggle for life not only exists between races, nations, animals, and individuals, but a continual struggle for life is going on in the organism of each one of us. Life consists to a great extent of an adaptation of internal defences to external circumstances. It is by studying nature's own methods of defence that we will be able to indicate the care required for the nose, throat, and ear in children. You may remember that some frivolous person has remarked that illness was like a struggle between two people, and that the doctor resembled the third man who intervened to separate them with a club. Sometimes he hit the disease on the head and sometimes the patient! Napoleon the Great, with a flash of genius, once remarked to his physician, "Believe me, we had better leave off all these remedies; life is a fortress which neither you nor I know anything about. Why throw obstacles in its defence?" But a hundred years have elapsed since Napoleon made this pregnant remark, and in the last century medical, surgical, and sanitary science have made more progress than in all the preceding centuries of the Christian era put together. Since Napoleon's day we have learned a great deal about this earthly fortress in which life is temporarily entrenched; we recognise most of the enemies trying to undermine it; and we know most of the methods by which it is able to keep the flag still flying.

Of all the defensive mechanisms of the body few are equal in importance to that of the nose. The chief functions of the nose are as an organ of smell, as a resonating chamber for the voice, and as a filter for the air we breathe. The nose is the natural and sufficient channel for breathing through. The mouth should only be used as an accessory air-way in case of emergency. This nasal air-way has no rest day or night. Many infections are introduced into the throat by the open mouth, or into the stomach by the food; but these doors of entry are closed all night, and are only occasionally open during the day. At night the eyes are closed, the ears are insensitive, the brain is at rest, and the heart beats are slackened; but breathing goes on steadily and unconsciously, and every breath is purified, and noxious germs are filtered off from it, all night as all day.

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[1] The Hospital.

A glance at a model will show the convoluted lining of the nasal cavities. This lining is convoluted so as to expose a large surface to the air. It is continually bathed with sticky mucus; and it is on this sticky mucus that germs are emmeshed, and here they get fixed, much as bird-lime will capture a little bird. Not only do the germs passing into the nose get stuck on this surface, but they are quickly turned out by what we know as ciliated epithelium. The surface of the delicate lining of the nose is covered with millions of minute microscopic rods. All through life these keep waving, like the tentacles of a jelly-fish, and they keep waving always in one direction—towards the orifice of the nose. When this is viewed under the microscope it looks like a field of wheat waving constantly in one direction. Any irritating particle of dust which gets into the nose is often expelled more quickly by the abundant flow of mucus which it excites. But the minute germs which try to invade our nasal fortress are quickly passed down by these waving rods ("cilia" as we call them) to the entrance of the nostrils. The entrance of the nostrils is further protected by hairs. During a foggy day in London, or a dusty railway journey, we have only to wipe out the entrance of the nose and see the amount of dust which these hairs will arrest. The microbes, then, are wafted down to this same region, and as they are entangled in the mucus they cannot do any more harm. To realise how much work the nose has to do in this purifying process it is well to recollect that on an average in twenty-four hours we inhale 10,000 litres of air. At the lowest estimate 1,500 organisms are inhaled into the nose every hour, and it must be a common event, at least in our average London atmosphere, for 14,000 organisms to pass into the nose during an hour's tranquil respiration. This would give 336,000 microbes for the nose to deal with as one day's work. I have not yet calculated the number with which the nose has to struggle when walking behind a lady with trailing skirts, travelling in a two-penny tube, or trying to jump on a motor bus! The lining membrane of the nose has other functions. No matter what the temperature of the outside air may be, the nose is sufficient to warm it comfortably before it reaches the throat; the nose also, if the air is too dry, moistens it to a suitable degree.

Thus, before the air gets near the lungs it is filtered of dust and microbes, and agreeably warmed so as to make it fit for respiration. From the back of the nose a tube passes up to the ear, so as to supply an equality of air pressure on each side of the drum. When this tube is blocked, as it is when one has a cold, we all recognise the interference with acute hearing.

But behind this first line of defence there is another line of defence in the throat. We all know what and where the tonsils are. Besides the two tonsils which we can see at the back of the mouth there is another tonsil at the back of the nose. This latter tonsil does not make its presence known until it gets diseased or too much enlarged, when it is recognised as an adenoid growth. What exactly is the duty of the tonsils is not completely understood; but there can be no doubt that, as they are absent in the healthy adult and always present to some extent in childhood, they serve to protect the body from its outside enemies. There are other defensive arrangements, such as sneezing and coughing, which all help to keep the fortress intact.

Now we can understand the importance of the upper air passages in the preservation of health. We are now able to explain how they act, although, empirically, it had long been recognised that it was more natural to breathe through the nose than through the mouth. An American wittily remarked that "Man was the only animal that breathed through his mouth, and he was a fool when he did so." Many years ago a layman wrote a small book with the engaging title "Shut your Mouth and Save your Life." While in the most sacred of books we read that "the breath of life was breathed into man's nostrils."

Just as the mouth masticates and prepares the food for the stomach, so does the nose prepare the air for the lungs. When the nose is permanently obstructed, mouth breathing has to be adopted. Life can still be carried on—for Nature is full of compensations—but at a disadvantage. The cold air, unmoistened and unfiltered, enters through the mouth, drying the throat and exposing the lungs to greater danger. The teeth are more apt to decay; and they do not grow properly. Tennyson has recognised this in Locksley Hall, where he refers to an individual as "He with the rabbit mouth ever agape"; and George Herbert long ago wrote, "Look to thy mouth, diseases enter there." When the nose is not used for breathing purposes it, like other unused things in life, ceases to develop properly; and although the mouth serves to replace it, it only does so imperfectly.

The appearance of the habitual mouth-breather is now so well known that we are able to recognise him across the street. The victims of nasal obstruction are seen to have a narrow, undeveloped nose, a drooping and projecting lower jaw, a constantly open mouth, through which the upper teeth project, while the absence of action of the muscles round the mouth give to the face a smooth, stupid, vacant, semi-idiotic expression. These patients are apt to be round-shouldered, with a tendency to curvature of the spine, narrow-chested, and not infrequently pigeon-breasted. Such is the appearance of the adenoid child with whom we are all acquainted nowadays. Adenoids are no new invention, nor are they limited to any race or climate. Photographs show that they are known from Greenland to the equator, while pictures in the Florence Galleries and statues in the Vatican prove that they existed in the periods of the Renaissance and of Greek antiquity.

Now that we have studied the natural methods of defence in the upper air-passages, we are in a position to think over the care to be taken of them in childhood. First of all, both for the sake of general health, and not to overwork a willing servant, the air supplied to the body should be as pure as possible. Although climates have their advantages, we must remember it is more important how we live than where we live. Sewage air should be as much avoided as contaminated food and drink. We have seen how the nose filters and warms the air before it reaches the lungs, so that no one at any age need fear an abundance of outside air. At night, so long as the child is warm in bed, the night air may blow over it freely. When it takes its walks or drives abroad it need not be half-smothered in a thick veil, with the hood of the perambulator up and backed against the wind, so that it breathes over and over again its own exhalations. Respirators over the mouth are useless, if the mouth is closed, for the nose is Nature's perfect respirator. If mouth-breathing is a necessity the respirator starves the wearer of his much-needed oxygen.

Superabundant mucus from the nose must be got rid of. For man the natural and civilised method is by blowing. No child instinctively knows how to blow its nose, just as no child knows how to expectorate. The expectoration which a child raises from its chest it promptly swallows into the stomach, and any excess of mucus from the nose is allowed either to stagnate there, to flow backwards into the throat, or to dribble on to the upper lip. At the best it is simply wiped away—sometimes by the nurse with her own already contaminated handkerchief. The nose should be blown out, and not simply have its extremity dabbed. In the art of cleansing the nose the man in the street is the sensible person. One nostril should be closed with the thumb (covered with the pocket handkerchief), while down the other nostril a full blast of air from both lungs drives all secretion into the handkerchief. The process is then repeated for the opposite nostril. Children with catarrh should have their nostrils thoroughly cleared in this manner two or three times a day, and not be ineffectually irritated by simply having their noses frequently wiped.

Vigorous exercises—running, dancing, skipping, and all sorts of games—should be carried out with the mouth closed. But if the child has difficulty in breathing through the nose it is not wise to insist on the closed mouth. Ineffectual efforts to draw sufficient air from a narrow nose may result in the indrawing of the chest walls, as seen in the photographs I hand round. It is in such cases that the so-called breathing exercises do harm; their use comes in after the nose has been rendered normally patent.

For the care of the lower throat—the pharynx as we call it—there can be no doubt that the act of mastication has a healthy influence, and children should be taught to chew their food properly. Mufflers round the neck should be abolished; they do not reinforce any of the natural defences, but rather weaken them by interfering with the physiological action of the skin.

The proper use of the voice is the best protection for the vocal cords. The subject of voice use, including breathing, vocalisation, and enunciation would lead us into too wide a subject at present. We English, as a race, are such bad speakers that we should lay to heart Carlyle's remark where he says that "God has gifted you with a tongue and has set it between your teeth that you may show to us your true meaning, not that it should be rattled like a muffin-bell." In children it is remarkable what an amount of, to us, high-pitched, screaming, and yelling their little throats will stand. We should not check it, for joyous shouting and laughing, particularly in the open air, is doubtless a more natural and healthy exercise than any amount of informal indoor breathing-exercises. But we should take particular note if the child's voice appears to have at all what we call a nasal tone. This term is given when the nose is more or less obstructed. Of course as a matter of fact the voice does not assume a nasal character—it is just the want of nasal resonance which gives to the voice this dead, smothered character. The method which I employ is the use of the words, "Clapham Common." If a child pronounces it "Glabbad Gobbod," we are generally right in suspecting some nasal obstruction, and most probably adenoids.

Hearing is probably of all the special senses the most important; both in education and in the pleasures of life. There are some important points to bear in mind in regard to the care of the ears, but they are not numerous, for, as an American has advised, "Take care of your nose and throat, and trust to God for your hearing." But it is highly important that the earliest symptoms of deafness in childhood should be recognised. I have little doubt that 90 per cent. of the cases of deafness in adult life can be traced to neglect of this. No child should be labelled as inattentive until the doctor has pronounced that the ears are normal. Even short recurring attacks of very slight deafness and every case of earache should receive skilled medical advice. The wearing of cotton wool in the ear, except when ordered by a medical man, is as unnecessary as it is unsightly, and can only help to make it delicate.

Boxing the ears is so generally recognised as extremely dangerous that it is hardly necessary to refer to it. At the same time it is well to remember that damage to the drum of the ear may occur, if it is weakened by disease, by such acts of the individual as sneezing, coughing, or even blowing the nose. In such occurrences any teacher or nurse who had given a child some mild chastisement might be blamed for an accident to the ear of which they were quite innocent. Injury to the drum of the ear may also occur from other causes than what diplomatists call "unfriendly acts." Even an expression of affection may cause it, as I have heard of the drum being injured from a too vigorous kiss being applied to this orifice.

The ear is kept lubricated by wax. This is secreted in the outer half of the ear passage, and serves a very useful purpose. Like the mucus in the nose, it doubtless acts for the ear as a sort of bird-lime, preventing flies, dust, etc., from getting into the depths of the ear. This wax is being worked outwards by the movement of our jaws in mastication. When it reaches the surface, where it becomes visible, it is wiped away with the ordinary cleaning to the ear. Many people are much too anxious about getting the wax out of their ears. In their efforts to do so they are apt to push it so far inwards that it is no longer worked out by the action of the jaws. Many attempts to extract it may affect the ear drum. Picking out the wax from the ear with pins, toothpicks, ear scoops, etc., should be strictly forbidden. No one should introduce into his or her ear anything smaller than their own little finger, covered with the thickness of a towel.

Children, with their thirst for adventure and the mysterious, frequently introduce foreign bodies into their throats, noses, and ears. The collection is almost too large to enumerate. Perhaps marbles, buttons, beads, seeds, bits of pencil, pens and nails are their favorite treasures. Those in charge of children should be very chary in making hasty attempts at removal. Not infrequently unskilled efforts are only apt to push such a slippery article as a glass bead still further into depths of the ear or nose.

It may be laid down as a principle that no foreign body should be allowed to remain in any of the upper air passages except when under medical inspection. If it is introduced in the nose efforts at expulsion should be encouraged in the method I have described—*i.e., à la paysanne,* as they say in France. For the ear the most suitable remedy is a syringe and some warm water. In the throat no attempt should be made to get rid of a foreign substance, such as a piece of meat, by pushing it backwards, unless the child is threatened with immediate suffocation.

CARE OF THE EAR IN CHILDREN.

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I.

The children of the present day are receiving much more attention than they did a few years ago. The instructors and school officials are awake to the fact that a child who takes no interest in school work, who does not seem to learn or advance with the majority of the class is more to be pitied than censured and have endeavored to find a cause. The departments of health of our large cities have been taken into consultation so to speak, with the Boards of Education and Correction and the results have been marvelous. In the majority of cases where a child is backward, some physical or mental defect can be found and often corrected so as to produce brilliant results in a short space of time. The senses of sight and hearing must be nearly perfect or the child is greatly handicapped for life's work. Naturally a child that does not hear well in a school room will fail to understand what is required of him and will appear mentally dull, shy and backward. This child is often blamed for what he can not help, is considered heedless and stubborn, grows nervous later and is frequently the victim of chorea, and other nervous disturbances.

A large proportion of these cases will be found to be mouth-breathers and have that dull, stupid expression characteristic of the condition. If the ears of these cases are examined, the drums will be found to be retracted and in many cases of extreme deafness the malleus handle will be found resting against the inner tympanic wall. If the condition has existed for a long time, the drum will have begun to take on an opacity or may have become thicker. This poor-hearing may be a constant condition or it may alternate with periods of good-hearing power. Generally in the winter months the hearing and nasal obstruction will be worse; or after an acute coryza. Why should such a condition exist? The Eustachian tube is the ventilator for the tympanic cavity. In order that the drum may vibrate when a sound wave strikes it, the air pressure must be equal both sides of the drum, of course that means that the Eustachian tube shall be patulous. Inspection of the Naso Pharynx, or more often the introduction of the finger into the Naso Pharynx will reveal the presence of adenoids.

Now what takes place? The tube being closed no fresh supply of air can reach the tympanic cavity. The air already in the cavity looses its oxygen, rarefaction is the result, causing greater pressure on the drum from without, and consequent retraction of the drum, and loss of vibration. Naturally the only remedy is removal of the tubal obstruction.

In the majority of cases in adults, deafness is due to middle-ear catarrh. Now two-thirds of the cases can be traced to the harmful effects of adenoids in early life. The great importance of care and proper treatment at this time can readily be appreciated. We all know that adenoid tissue has a tendency to shrink at puberty. This fact has given rise to the question "Why remove it then, why not wait for nature to take care of it?" Unfortunately we have too long to wait and the damage will have been done and repair impossible.

Drainage of the Eustachian tube is of great importance for let infection take place and we have proof that nine-tenths of the cases of adenoids will result in middle-ear abcess with its consequent dangers from complications.

Now not every case of deafness in children is due to middle-ear disease, the labyrinth and auditory nerve may be the seat of the trouble. Inherited or acquired constitutional disease may be the cause The epidemic of meningitis of a year or so ago is the cause of many deaf-ears and, occurring in children too young to have talked fluently is the cause of many cases of deaf-mutism. The loss, of audition in early life or congenital defect in the organ of hearing, leads to deaf-mutism. Heredity plays an important part, very often several members of the same family will show the defect.

Consanguinity of the parents (Deuch) is the most common of the causes. Hereditary specific disease is also a causative factor. The diagnosis of mutism is often difficult under two years of age, as the age at which a normal child will talk varies. If a child learns a word or two and then does not advance in a reasonable time, we should be suspicious. About a year ago the parents of a boy three years of age brought him to me saying that he did not talk as they thought he should and wanted his throat examined. He was a robust boy for his age but could speak only five or six words and those sounded very harsh and unnatural. Before examining his throat I found that the child could not hear, deafness profound. The parent's were greatly astonished when I told them so, they had no idea that he could not hear but a few minutes' reflection made them of the same opinion. Examination in this case revealed retracted drums and a small amount of post-nasal adenoids, but the deafness was so profound that my prognosis was unfavorable and I told the parents that unless improvement followed the removal of adenoids I was afraid he would not hear. Removal of adenoids and restoration of the drums failed to improve the case and he did not improve in spite of promises by many otologists in New York.

In a child the diagnosis of nerve deafness is more difficult than in an older person, as our instruments of precision, namely the tuning-fork and whistle are unreliable.

Ear diseases in children are common and for purposes of description we will classify them under three heads, namely those of the external, middle and internal ear structures.

The external ear or that portion external to the drum.

Probably the most common disease of the external ear in children is an eczema of the Auracle. Redness and swelling of the skin followed by vesicular eruption and serous oozing, also severe itching and burning may be followed by the scaly eruption and thickening always associated with a constitutional disorder that needs attention.

Impacted cerumen so common in adults is rarely met with in children, can not explain why.

Foreign bodies are frequently met with in the ears of children, often buttons, beads, beans and so forth, best removed with syringe and warm water, or an anesthetic may be necessary and instrumental extraction. Diffuse or circumscribed inflammation of the external auditory canal is frequently met with. The circumscribed is often called furuncle. Both varieties are exceedingly painful, may give rise to swelling external to ear and may be very difficult of diagnosis from more serious affections especially if associated with a middle-ear suppuration.

Acute middle-ear inflammation is also a dangerous and painful disease, and may be conveniently described in two classes, one which suppurates and one which does not. The seat of the disease is the mucous lining, from here the changes start which may not only damage the organ of hearing, but may prove dangerous to life.

My classification into suppurative and non-suppurative would hardly be sufficient in describing middle-ear diseases of adults as the inflammatory processes show great variations anatomically as well as clinically.

The course in middle-ear inflammation is either acute, subacute or chronic and may heal with complete restoration of the hearing or by the production of permanent disease products producing deafness in a varying degree. Quotation from Politzer shows how difficult is the classification of middle-ear diseases. Attempts have been made to group the different forms of middle-ear diseases into different classes; as a basis of classification some made use of the etiology of the affections, others the pathological conditions present. Practically these classifications proved useless, for while on the one hand, similar processes may be produced by different causes, on the other with similar anatomical changes the clinical aspect of the middle-ear inflammation may be quite different. In a similar manner clinical observation as well as the anatomical condition contradicts a view which has been advanced namely that the different forms of middle-ear inflammation are only successive steps of one inflammatory process.

I would again divide my non-suppurative inflammations into two varieties, namely the Eustachian Catarrhal type and the tympanic inflammatory type. The Eustachian catarrh or tubal catarrh usually arises from an acute coryza, or it may complicate light attacks of the exanthemata. The use of the nasal douche or the entrance in any manner of fluid into the Eustachian tube may cause an attack. The chief pre-disposing cause is some obstructive lesion of the nose or naso-pharynx. The pressure of adenoid vegetation is a particular factor in its causation since these masses from slight temperature changes become engorged with blood causing venous conjestion of the walls of the tube narrowing or closing its lumen. An attack of this disease occurring during an attack of coryza is usually characterized by a sudden onset of the symptoms. If old enough the patient will complain of a feeling of stuffiness or heaviness in the ears. If too young to explain the child will be restless and fretful and be exceedingly hard of hearing; rarely is pain present in this condition, the restlessness undoubtedly being due to the noises of which the older patient will complain. Disturbances of equilibrium which are frequently met with in adults I have never met with in a child. It is seldom that both sides are affected at the same time to the same degree. An inspction by reflected light reveals the membrane drawn inward, the malleus handle shortened, the short process exceedingly prominent, the light reflects often absent, and very slight or no congestion of the drum. Without treatment this condition generally subsides without impairment to the functions of the ear unless several attacks occur in rapid succession. If the tuning-fork is used in an examination of these cases, bone conduction is raised and air conduction diminished; a vibrating tuning-fork placed upon the vertex or brow will be heard better in the poorer ear. In treating these cases the object is first, the treatment of the acute attack and second the prevention of subsequent attacks. The treatment of the acute attack consists in the clearing of the Eustachian tube and restoring the position of the drum. This is best accomplished in a child by the Politzer inflation—care must be taken lest a too forceable inflation rupture the drum, as the sudden force of air against it may do damage, the nutrition of the part being poor at this time.

The only prevention of future attacks is the removal of nasal or post-nasal obstructions and care of the general health. Syrup Feni Iodide and Hypophosphitis with Arsenic are useful.

Acute Catarrhal Ætetis Media is a term applied to an acute inflammatory condition within the middle-ear. Why one case should have a simple congestion of the tympanic lining, another an acute inflammatory process with mucuous secretion, another pus formation, the cause being the same it seems hard to explain. Probably the amount of resistance of the patient or the germ of infection. This condition may accompany measles or a cold in the head, or may follow the introduction of fluid into the Eustachian tube.

In young children the symptoms of this condition are so severe as to make one think that a much graver disease is in progress. The attack usually comes on at night, the child at first tosses in its sleep, gradually grows more uneasy, sleep is disturbed and the child awakens and gives every evidence of intense suffering. The temperature is very high, may reach 105 a few hours after the trouble begins and from the fact that the ear is usually the last organ suspected almost anything may be thought in progress until a thin serous discharge in the external auditory meatus proves the condition. After the rupture of the drum and the discharge appears, the temperature usually falls rapidly but may remain 101 or 102 for three or four days. Usually complete relief to patient follows rupture of the drum. The same condition returns if drainage is interefered with. The discharge may cease in a few days and drum heal or in case of a virulent infection or in a case accompanying scarlatina, diptheria, or some epidemics of la grippe, we have acute purulent inflammation of the middle-ear. The presence of pus indicates a necrotic process, here we have a most dangerous condition as boney necrosis is exceedingly rapid and the neighboring organs are in danger. The symptoms may be similar to those in the acute middle-ear inflammation first described or may be ushered in by a convulsion, temperature high, pains severe, a convulsion occurring during scarlatina or a sudden rise of temperature without apparent cause should always excite suspicion of the ear being involved, it should be inspected immediately as prompt treatment may do much towards saving the organ and possibly life. The appearances of the drum are our guide to the conditions present in the middle-ear, if we can not see the laced marks namely the short process, handle of malleus, and light reflects, we know something is wrong and if the drum bulges we are quite certain there is pus behind it. We should not depend upon finding the drum conjested or reddened as in many cases the dermal layer will have separated giving a greyish appearance. The bulging and absence of the land marks are quite indicative of the condition. Incision of such a drum giving vent to the pus is always indicated. In some forms of scarlatinal or diptheritic otitis our best efforts in the early stages will fail to save the organ and the malleus and incus may rapidly become loosened and may be cast off with the discharge, but fortunately by early incision and vigorous antiseptic cleansing such calamities are not the rule. The dangers of delayed incision only invite extension to the neighboring organs namely, the mastoid process, the lateral sinus and the cerebal cavity. The involvement usually occurring in the above order.

Diseases of the brain and its membrane play an important part in bringing about secondary affections of the auditory nerve. Amongst these the following which often occasion a marked form of deafness may be specially mentioned, epidemic cerebrospinal meningitis, hydrocephalus, acute and chronic encephelitis and some times diseases of the spinal cord. These general and infectious diseases as typhoid and scarlet fevers, measles, diptheria, influenza, intermittent fever, syphilis, must also be regarded as frequent causes of disturbances of hearing, owing to their influence upon the auditory nerve. A great number of clinical observations are now on record of cases in which the auditory nerve was affected as the result of an attack of mumps. Diseases of the internal ear are met with more frequently in children than in adults. Frequency of the affections of the auditory nerve diminishes in middle age but increases again in later life even after the sixtieth year.

Disease of the labyrinth may be caused by those diseases that we have mentioned as affecting the nerve.

Voltalini has drawn the attention of otologists to an affection of the ear occurring in children which he designates as acute inflammation of the labyrinth. In children who were previously healthy, the disease arises suddenly with fever, marked redness of the face and vomiting which are soon followed by unconsciousness, delirium and convulsions. These symptoms disappear completely within a few days but total deafness and a staggering gait remain for some time.

Secondary inflammations of the labyrinth which are caused by the extension of a purulent inflammation of the middle-ear are more frequently met with.

SOCIETY PROCEEDINGS

JOINT MEETING OF THE CHICAGO MEDICAL AND CHICAGO PEDIATRIC SOCIETIES.

February 27, 1907

Dr. J. W. Vanderslice, President of the Chicago Pediatric Society, in the Chair

Symposium on Scarlet Fever

Etiology and Pathology.—Dr. Ludwig Hektoen discussed the etiology and pathology of the disease. Was scarlet fever a streptococcus disease? Since the earliest application of micro-biologic methods to the study of scarlet fever, the streptococcus had claimed the lion's share of attention. Its significance had grown as the observations had extended. At present the streptococcus was held by some to be the actual cause of the disease, while others (the author thought the majority) look upon it as essentially a secondary invader upon which, however, depended to a large extent the fate of the patient. As to the occurrence and the distribution of streptococci in scarlet fever, numerous investigations had indicated that streptococci occurred upon the tonsils of scarlet fever patients in far greater abundance than in health. Weaver in his study of the bacteria of the throat and skin in scarlet fever, called special attention to the enormous numbers of streptococci in the throat in this disease and to their gradual disappearance as convalescence progressed. For various reasons, but principally because of the lack of convenient means, most of the studies of tonsillar streptococci gave few details in regard to the cultures obtained. On this account G. F. Ruediger last year made a careful, detailed study by means of the newer methods of the streptococci and diplococci in the throat in scarlet fever, certain other diseases, and health. He made use of the blood agar plate method of Schottmueller and Rosenow. On the blood agar plate streptococcus pyogenes produced small gray colonies surrounded by a perfectly clear area of laking, while the colonies of certain other chain-forming cocci and of pneumococci were green. His results must be considered as striking because they showed that streptococcus pyogenes was constantly present in great abundance on the tonsils of patients with scarlet fever and tonsillitis before the throat symptoms began to subside. He found streptococcus pyogenes in small numbers only in 59 per cent. of the 51 normal throats he examined, while pneumococci and the large group of organisms (streptococcus viridans) that lay between the streptococcus pyogenes and pneumococcus were found in about equal numbers in the normal and the scarlatinal throats, thus showing that constant presence on the tonsils of streptococcus pyogenes in large numbers is an outstanding feature of scarlet fever.

From the throat streptococci frequently pass to neighboring structures and give rise to more or less serious local complications. They may also reach the circulating blood and cause streptococcemia as well as various internal and articular localizations. In 100 unselected cases of scarlet fever in which Hektoen examined the blood systematically during life, streptococci developed in the cultures from 12 cases, all of which recovered, although several were very ill. In Jochmann's series of 161 cases streptococci were recovered in 25, all of which died. By way of explanation of this divergence, he pointed out that his cases occurred in a mild epidemic, were strictly unselected, most of the patients being over ten years in age, and many over twenty; whereas Jochmann's cases occurred in a frightfully severe epidemic, the patients being children under ten and probably not strictly unselected.

All observers agree that in fatal scarlatina general streptococcus infection is demonstrable after death in the large majority of cases. Baginsky and Sommerfeld report streptococci in the blood and the internal organs of every one of 82 cases, including several in which death occurred early and in which there were no gross lesions. In other series general streptococcus infection was present in a smaller percentage of the cases, and several instances of fatal fulminating scarlatina have been described in which there was no demonstrable evidence of serious streptococcus infection. In general streptococcus infection, streptococcus pyogenes appears to be the predominating form. Occasionally, however, we meet streptococcus viridans. If streptococci play an essential and constant part in scarlet fever, then we would expect to find in the blood of the patients various specific anti-bodies for streptococci, more particularly agglutinins and opsonins. And in case the streptococci concerned in scarlet fever differ essentially from other streptococci, we naturally would hope to find in these biologic reactions means of differentiating between them. As a matter of fact, various observations have been made on the agglutination of streptococci by scarlatinal and other serum, but the results lack the desired uniformity. In an important article on the subject, Weaver has pointed out that this in part may be due to technical difficulties, in part because it has not been recognized adequately that variations in the composition and reaction of the culture medium have a marked influence on the agglutinability of streptococci. In general, Weaver's results show that in scarlet fever agglutinins develop for streptococci, but these agglutinins are not specific, for streptococci obtained from cases of scarlet fever, and like agglutinins form an equal degree in erysipelas and even in pneumonia, and probably other infections not necessarily streptococcal. No decisive conclusions are indicated by the agglutination of streptococci by scarlet fever serum, as to their relation to scarlet fever. The scarlatinal streptococco-agglutinins should be studied still more closely in the hope of obtaining results of more positive significance. Thus it is quite possible that fairly characteristic relations may be found to exist between the agglutinin curve and the course and character of the attack.

Experiments with the serums of animals immunized with streptococci have given results that in some instances were quite suggestive of a degree of specificity on the part of scarlatinal streptococci. Ruediger found that most strains of streptococcus pyogenes isolated from the throat in scarlet fever were clumped in fairly high dilutions of the serum of sheep immunized by an organism from the same source, but not at all by the serums of sheep immunized with a streptococcus from phlegmon of the leg or with streptococcus viridans. As to the streptococco-opsonic index in scarlet fever, Hektoen says that a recent study in the laboratory of the University of Chicago by Miss Tunnicliff, the results of which are not as yet published, indicate quite definitely that the index is below normal during the acute stages of the disease in the majority of the cases; as the symptoms subside, the index commonly rises above normal, to which the return may be more or less abrupt. During uncomplicated convalescence the index is normal or practically so. If complicating streptococcus localizations set in, the index remains low until improvement begins. These variations in the streptococco-opsonic index appear to be specific, because they are not associated with corresponding variations in the opsonic index for other bacteria, such as the pneumococcus, the staphylococcus, and pseudo-diphtheria bacilli. From the facts presented, he said we are justified in concluding (1) that the predominant feature of the bacteriology of the throat in scarlet fever is the constant presence of large numbers of streptococcus pyogenes. (2) That the overwhelming majority of the so-called complications and of the deaths in scarlet fever is due to invasion of the tissues and the blood by this microbe. (3) That in scarlet fever, even when mild, the organism gives evidence of systemic reaction to streptococci by variations in the streptococco-opsonic index, and probably also by the formation of streptococco-agglutinins. There is, therefore, no escape from the conclusion that streptococcus pyogenes or some form thereof plays a most significant part in the scarlatinal process; but are we ready to take the final step and conclude scarlet fever is wholly a streptococcus disease, all the phenomena of which, including the acquired immunity, are satisfactorily explained by the distribution of the cocci in the tissues and by the intoxication with their products? It is quite true that many of the essential phenomena of scarlet fever, such as the initial symptoms, the angina, the fever, the leucocytosis, and even the rash, may be explained by what is really known of the pathogenic powers of streptococcus pyogenes and which probably in no small degree actually shares in their production, but there is no analogy in recognized streptococcus infections of the immunity conferred by scarlet fever even when mild. There is no evidence that scarlet fever leaves behind it a lasting immunity to streptococci, and it is known that the specific immunity which results from streptococcus infections in general is not at all marked and only brief in duration. If scarlet fever is caused by a form of streptococcus pyogenes, this must be assumed to possess very pronounced and peculiar immunizing properties of which as yet scientists have been unable to discover definite experimental evidence.

There is a reported lack of evidence of streptococcus invasion in certain instances of fulminating scarlatina.

The author considered the acceptance of the streptococcal theory of scarlet fever from the point of view of the spread of the disease. This acceptance would seem to involve no special difficulty so far as the most important of the recognized modes of dissemination are concerned, namely, through contact in various ways with materials from the throat; it is different, however, with respect to the question of the infectiousness of the skin and the reputed longevity of the scarlatinal virus. It is universally believed that the scales of scarlet fever patients are infectious far into convalescence. According to Weaver's careful study, the bacteria obtainable in the skin and scales of scarlatina are quite the same as those found on the skin in health. Raskin obtained streptococci from the skin in four cases in twenty; Gordon's search yielded no positive result; Weaver found streptococci in skin cultures in one case in fifteen; and Dreyer failed to find streptococci on the skin of thirty cases. The conclusion is plain, that if streptococci cause scarlet fever, they reach the surface of the body so rarely that the infectiousness of the skin must be greatly overrated.

Medical literature contains numerous instances of apparent conservation of the scarlatinal virus over long periods of time—several years, whereas the longest time that Weaver could cultivate streptococci from preserved scarlatinal material was ninety days.

There are rather definite obstacles to the unreserved acceptance of the streptococcus theory of scarlet fever. The view that the specific cause of scarlet fever is not known, and that the streptococcus is a concomitant or secondary invader for the growth and activity of which the conditions in this disease are peculiarly favorable, seems to Hektoen to harmonise better with the facts now at hand. This view receives strong support from the fact that smallpox is practically always associated with streptococcus invasion, so that the claim has been set up that smallpox, too, is a streptococcus disease. Perkins and Pay dispose of this claim, however, by causing smallpox in monkeys with materials entirely free from streptococci, and these, as expected, have no such effect. It has been said that smallpox would be a relatively harmless disease were it not for the streptococcus invasion, and there are certainly good reasons to look upon scarlet fever in the same light.

In view of the paramount importance of streptococci in the course and outcome of scarlet fever, the chief significance of the pure scarlatinal virus would seem to lie in its power to open the door, so to speak, to streptococci. From this point of view, the need for potent antistreptococcus remedies is as urgent and their eventful specific effects as logically explainable as would be the case were scarlet fever considered a streptococcus disease pure and simple. In view of the fact that streptococci grow in virulence, in the susceptible animal organism, it is the duty of the physician to guard carefully by adequate isolation against the transfer of specially virulent strains from patient to patient. From what is known of the dissemination of the throat and mouth bacteria in coughing and other ways, we can understand the great chance for such transfer when patients lie side by side in the same room. The sad instances of several deaths from scarlet fever in children of the same family, sometimes spoken of as examples of family susceptibility to scarlatina, often result from the passage from child to child of especially virulent streptococci.

Prophylaxis of Scarlet Fever.—Dr. Heman Spalding said that in considering preventive measures for scarlet fever, it should be borne in mind that scarlet fever is not so generally infectious as measles or smallpox. In a community of susceptibles—those never having had the disease—about thirty-eight per cent. will contract the disease when exposed to it, whereas in a like community, about 90 per cent. will contract smallpox or measles if exposed to those diseases. The susceptibility to scarlet fever is therefore not so universal as is the case in some other infectious diseases. Only 7 per cent. of those who have never had the disease, above forty years of age, are attacked when exposed to scarlet fever, and that infants under four months of age are rarely attacked. From the manner of transmission, it is assumed that the disease is caused by a microorganism, and that this organism can be conveyed a short distance in the air, as in a room, but no great distance in the open air; that it can be conveyed from the sick to the well on articles of clothing, furniture, or any of the ordinary things in use if they have been infected with germs emanating from a scarlet fever patient.

The proof is strong that the infection can be conveyed through the milk supply. Some evidence has been adduced that cows have scarlet fever and are responsible for outbreaks of the disease supposed to originate from the milk supply. It is generally believed that the milk is infected from persons convalescing from scarlet fever engaged in milking or in handling or delivering milk to consumers. The inspection of dairies has therefore become a necessity. Fruit and vegetables peddled from a house where scarlet fever exists can be the means of spreading the disease. The infection has been conveyed through the mails in letters sent from an infected house.

The prophylaxis of scarlet fever consists in separating the sick from the well and destroying all infection emanating from the scarlet fever patient. To accomplish this all cases of scarlet fever should be reported to a responsible health officer. All cases that cannot properly be isolated at home should be taken to an isolation hospital. When the case is taken to a hospital, the premises should be disinfected, and the inmates now exposed kept from mingling with others for eight days. If scarlet fever is treated in the home, a warning card should be placed on the door. The patient should be placed, if possible, in a room apart from the rooms occupied by other members of the family. All doors opening into the patient's room should be covered with a sheet kept wet with a disinfecting solution. A bed sheet or one made from cheap cotton cloth should be fastened to the top of the door frame and down the hinged side of the frame, leaving the edge on the lock side free to be turned back when passing through the door. The sheet must be long enough to allow two or three inches to lie on the floor. No articles of furniture, such as carpets, rugs, curtains, ornaments, books, etc., except the things actually necessary for the care and comfort of the patient, should be left in the sick-room. No persons except the strictly necessary attendants should be allowed to enter the sick-room. These should wear only such clothing as can be boiled in water. The hands should be rinsed in a disinfecting fluid immediately after every attention to the patient. The floor of the sick-room must not be dry-swept. Instead of sweeping, the floor should be gone over with a mop or cloth wrung out of the disinfectant. Instead of dusting all accessible surfaces, as doors, door-knobs, etc., etc., and the exposed parts of the bed frame, they should be wiped with a cloth dampened with the disinfectant. All dishes and table utensils used in the sick-room must be placed in a disinfecting fluid before being taken from the room. Flowers brought to the sick should not be thrown out, but placed in the disinfecting fluid and then burned. All discharges from the mouth and nose in scarlet fever should be received on pieces of old soft cotton, linen or worn handkerchiefs, and burned at once. A cuspidor or other spit vessel should not be used in the sick-room. The night vessel should be kept one-third full of a strong fluid (bichloride of mercury solution or a solution of carbolic acid), to be emptied not sooner than half an hour after each use, and then immediately resupplied with fresh fluid. All discharges should be disinfected in this way before being emptied into water-closets or otherwise disposed of. The precautionary measures should be continued after recovery or death of the patient until the house in disinfected.

As to how long scarlet fever victims should be isolated, there seems to be more ignorance upon this question in the medical profession than upon any other medical subject with which he is acquainted. There are men in the Chicago Medical Society who ask for disinfection of the premises one, two or three weeks from the onset of a case of scarlet fever, and when desquamation is plainly in evidence. Complete isolation should be enforced until all desquamation of the skin is completed, and there is entire absence of discharge from the ears, nose, throat, suppurating glands, or inflammation of the kidneys. The time required for scaling will vary from four to eight weeks. Mild cases, in which scaling is not noticeable, with absence of the ear, nose, throat, kidney and glandular complications, should be isolated not less than six weeks. In severe cases, not less than eight weeks should be the period of enforced isolation, and if ear, nose, throat, glands, or kidneys are diseased, the time should be prolonged until these are well. When the case is ended all sheets, pillow slips, towels, and other washable articles in the sick-room should be soaked in the strong disinfectant solution and removed while wet to the laundry, to be there boiled at least thirty minutes. Dr. Spalding spoke of washing the floor and all woodwork, and also described the method of disinfection by formaldehyde. He likewise pointed out the precautions that should be taken in a case of death from scarlet fever.

A too early termination in cases of scarlet fever and careless and faulty isolation of patients are the most serious problems in the management of scarlet fever in a large city. All cases not properly isolated at home should be taken to a hospital. It is impossible to emphasize too strongly the point that after scarlet fever the entire house should be disinfected.

Clinical History and Diagnosis.—Dr. John M. Dodson presented a summary of the course and symptoms of scarlatina as presented in 300 cases treated at the Memorial Institute for Infectious Diseases. He described the course of the usual type of moderate severity, and then noted the distinctive features of the more severe forms of the disease.

All types of scarlatina were characterized by abruptness of onset and the brevity of the prodrome. The period of incubation is short as contrasted with that of the other exanthemata, averaging from two to four days, rarely six or seven, while most of the cases reported as having an incubation exceeding ten days are open to question. A child who has been exposed to infection, the possibility of subsequent infection being eliminated, who has no symptoms within a week, may, with almost perfect assurance, be regarded as having escaped infection from that exposure. The period of invasion is very brief for so serious an affection, ranging from twelve to thirty-six hours, rarely beyond forty-eight hours. The chief prodromes, in the usual order of their sequence in children of the most susceptible age, three to ten years, are vomiting, fever, headache, angina, backache, not infrequently convulsions, especially in the very young(in the adult a chill), and, less uniformly, diarrhea. In older children and adults the sequence is more commonly angina, headache, fever and backache. The vomiting is of the expulsive type, without nausea, seldom more than two or three times repeated, and the occurrence of such a phenomenon, without other cause, especially in the presence of an epidemic, is alone sufficient in young children to arouse a strong suspicion of scarlatina. The symptoms mentioned were discussed at length.

As to the complications, the most common of all is otitis, which occurs in ten to eleven per cent. of the cases, and more commonly in those of the severe type and in the young. It may occur at any stage of the disease, from about the end of the first week until late in convalescence. Inflammation of the external auditory canal is severe, but is usually brief. The serious affection is an otitis media, arising from an extension of the naso-faucial inflammation. Beginning with pain in the ear, tenderness, fever, irritability of temper, some enlargement of the glands beneath the ear, which occasionally suppurate, these symptoms may subside in two or three days, with rupture of the membrane and discharge. Mastoid involvement with all its symptoms and the possibilities of meningeal involvement, sinus thrombosis and the like, occurs as in otitis media from any other cause. About ten per cent. of the cases of acquired deafness and dumbness can be traced to scarlatina, not including the many cases of partial impairment of hearing. Cervical adenitis as a complication occurs in about eight or nine per cent. of cases, commencing, as a rule, in the second or third week of convalescence, leading to suppuration in about one-third of the cases, and exceptionally to extensive cellulitis and destruction of the tissues of the neck. Scarlatinal arthritis is seen in from four to five per cent. of the cases, and differs from rheumatism in several particulars. Its site of predilection is in the small rather than the large joints, and preferably those of the fingers, hand and arm, or, if in the leg, the feet and ankles rather than the knees and hips. One of the most insidious and dreaded complications is the nephritis which, as a severe inflammation, is observed in three to four per cent. of patients. Unlike most of the other complications, it is common after mild as well as severe attacks. It is especially to be seen in the cold, damp weather, and when the patient has not been protected from these conditions.

The prognosis in scarlatinal nephritis is usually favorable under suitable conditions and management. When the complication arises while the patient is in the hospital, chronic nephritis may result or death ensue from uremia, suppurative inflammation or acute pulmonary edema. Eczema and ulcerative stomatitis occur in about two per cent. each; tonsillitis in 1½, and bronchitis in one per cent., according to Caiger. Of the rarer complications there are many, and among them the author mentioned broncho-pneumonia, pleurisy, empyema, endocarditis, pericarditis, myocarditis, and jacute dilatation of the heart.

The diagnosis of scarlatina, when typical, is seldom attended with doubt. The sharp onset with vomiting, angina, rapid rise of temperature and pulse, and the prompt appearance of the eruption on the palate and skin, with the striking injection of the fauces and the peculiar tongue, combine to form a picture little likely to be confused with any other disease.

(*To be continued next month.*)

EDITORIAL

HYDROCEPHALUS AND EPIDEMIC CEREBRO-SPINAL MENINGITIS

Epidemic cerebro-spinal meningitis is unfortunately attaining a very widespread and definite footing throughout the United States. One of its most unpleasant and serious complications or sequels is the development of hydrocephalus, which complication has been recognized ever since the nature of the meningitis has been known.

It has been only since 1883, however, that its more exact nature has been recognized and it remained for Von Ziemssen to spread through his memorable system the knowledge of this peculiar disturbance.

This same clinician called attention to the paroxysmal nature of the hydrocephalic involvement. Sudden acute severe headaches, with nausea and vomiting, pain in the neck, with unconsciousness and vomiting, were the signs of the development of the hydrocephalus as outlined by Ziemssen. A clearer summary of the condition has not been obtained since his time.

From H. Koplik of New York (*Am. Journ. Med. Sc.,* Apr., 1907), we have an important study that is of considerable value in furthering our knowledge of these important and serious complications. He believes that three more or less distinct conditions may obtain in which acute dilatation of the ventricles may occur in the meningococcic epidemic form of the disease.

Clinically the most important of these is an acute dilatation which he terms "acute temporary hydrocephalus." It occurs very frequently in the early stages of the disease and on its recognition often hangs the issue of life or death. The chief signs occur within 36 hours or so after the onset of the disease. There is usually the sudden development of coma and collapse, the pulse becomes rapid and feeble, the temperature rises suddenly, the surface of the body is cold, the skin is clammy, there may be evidences of headache or vomiting. The pupils are usually dilated. There are no signs of localized paralysis. Percussion over the skull reveals a tympanitic note, and lumbar puncture shows that cerebro-spinal fluid is under great pressure.

Prompt and free lumbar puncture in the treatment of this form is of signal service. It not only is justifiable from the standpoint of diagnosis, but as in this acute distention from the exudate there is no permanent brain injury even though the pressure may be considerable, the relief of such pressure before injury does take place is rational and imperative.

A second form to which he calls attention resembles meningitis proper very closely. This form usually comes on later in the course of the meningitis. The exudate collects slowly in the ventricles, and the dilatation advances, and in young children where the loose skeletal union permits of wide separation such distention increases without grave symptoms. Here the tympanitic note may be absent in the very young, but usually comes out when the skull becomes more rigid. These are the usual cases in which hydrocephalus is always present to a greater or less degree and is not always differentiable from the disease proper.

A third form is also commented upon as having received attention from previous observers. It may occur at any period in the disease. The patients are usually doing pretty well, the temperature may be intermittently febrile, there may be some occipital headache. Gradually the patient becomes stupid; this is later followed by vomiting and an increase in rigidity; although the patients are fairly clear and able to answer questions correctly there is advancing stupor. A tympanitic note may be heard over the ventricles of one or both sides which increasing tympanitic resonance is a sign of an advancing and foreboding hydrocephalus. These are the cases of discouraging prognosis. An accompanying emaciation, intellectual dulling or clouding, paresis of the muscles of the face or of the extremities, convulsions, tremors, and vomiting is the picture that usually offers little hope of a turn for the better and efforts at the treatment are usually unavailing.

As to therapy Koplik returns to the discussion of the subject of lumbar puncture towards which procedure he takes a more conservative position than in previous writings. Indiscriminate lumbar puncture in cerebro-spinal meningitis is of little utility. It should be condemned. It is of distinct service in the patients with acute hydrocephalus, but is of much less value in the other forms. It is foolish to perform lumbar puncture for purposes of drainage of pus or seropus. Even for diagnostic purposes its use should be restricted.

ON THE ORIGIN OF FEVER

No subject connected with medicine has been discussed so actively as that of fever, and it has only been within comparatively recent times that much more ancient views regarding fever as conservative have again come to their own in the estimation of the schools.

Of the more recent studies one by F. Beitzke (*Berliner klinische Wochenschrift*, Vol. 33, 1907, p. 110) is of interest by reason of his adequate review of recent contributions to the pathology of fever and as a summary and point of departure for new views.

Fevers, speaking generically, have in common an increase in metabolism and an increase in the body temperature. This latter is a mean between heat production and dissipation, which in the well individual is kept in a state of balance at a fairly fixed point. In fever there is a break in this adjustment by reason of a break of both factors. Heat production is usually increased greatly, while heat dissipation, as a rule, suffers a diminution, although at the height of a fever, there is frequently an increase of heat dissipation as well.

The heightened metabolism is recognized to be the cause of the increase in heat production, which increase takes place largely in the nitrogenous elements of the tissues. Carbohydrates also are consumed, while fats are not utilized as much, although they disappear rapidly in the stages of inanition. A marked retention of inorganic salts is characteristic of the fever reaction.

Most fevers are caused by free organic or inorganic toxins, or occasionally from the toxins from abscesses or suppurative surfaces. They are assumed to act upon the heat regulating centers and it is argued that the fever is in reality a compensatory adjustment, and unless excessive, works for the overcoming of the organic or inorganic poison. For by high temperatures are not only many bacteria and their toxins destroyed but it has been widely shown that temperatures of from 100 to 104 greatly facilitate the reaction between toxin and antitoxin.

ABSTRACTS

Uncinariasis.—ADAMS (Arch. of Pediat., 1906, vol. xxiii., p. 241). Adams reports a rare case of hookworm disease in a white boy, aged 12 years, a native of Maryland. The early symptoms were tiredness, sleepiness during the day, and disinclination for games. Soon he developed almost continuous headache and great muscular weakness. His skin became of peculiar yellow tint. In four to five months he was too weak to walk, and the anemia was profound; red cells 1,500,000, white 5,600; hæmoglobin 20 per cent. Thousands of the ova of the Uncinaria americana (ankylostoma) were found in the stools. Some contained segmenting ova and others young embryos. He was given a light supper and a tablespoonful of Epsom salts at bedtime, a similar dose of salts at seven next morning, and 10 grains of thymol in an hour's time. Two more doses of the thymol were given after intervals of an hour and a half and another dose of salts after the last. Food was withheld until five in the afternoon. The treatment was repeated three times after intervals of seven to eleven days. Iron and manganese were also given. The treatment was repeated three weeks later, and after that he was discharged cured. A distinct uncinaria was proved to infest man in America in 1902, being endemic in the Southern States. Cases have been ascribed erroneously to malaria and to dirt-eating. The worms are about half an inch long. They live in the small intestine. Ova escape in the feces and hatch in about twenty-four hours. Infection takes place by the mouth, by drinking-water, food, or soiled hands. Cases vary much in severity. Ova are found in the stools in four to ten weeks after infection. Local indefinite symptoms are followed by anemia and, in bad cases, by dropsy. Even after isolation from source of infection the disease may persist for six or seven years. The diagnosis depends on the presence of ova and perhaps blood in the stools. Prognosis is good if treatment is adopted reasonably early.

Relation of Chorea with Tuberculosis.—TOUTAIN (These de Paris, 1906). The author found that lumbar puncture showed a lymphocytosis five times in the seven cases of chorea in which he examined the cerebro-spinal fluid. According to him this find would indicate that the organism had been invaded by some intoxication or some infection. In a certain proportion of the cases this infection is rheumatism. In others there is found scarlet fever, measles, whooping-cough or tuberculosis. In one observation the choreic syndrome was produced by tubercular granulations disseminated on the pia mater in the neighborhood of the motor zone. In other cases small granulations developed along the vessels in the neighborhood of the fissure of Rolando. Various hypotheses are offered in explanation by the author.

The Diagnosis of Late Hereditary Syphilis in the School-child.—SAXE (Arch. of Ped., Dec., 1906). Only twelve cases in which hereditary syphilis could be diagnosticated from the presumptive evidence of physical signs were found by the author among 2,500 New York school children examined. The children ranged from six to sixteen years and about equal numbers of boys and girls were studied. The heredo-syphilitic children ranged from six to fourteen years of age; five were boys and seven girls; all save one were deficient mentally; eight children showed Hutchinson's teeth; four showed the remains of syphilitic eye lesions and one showed an active keratitis. Three of twelve cases had hydrocephalic heads. All showed retarded physical development, and seven of the total number showed associated rickety changes in the bones. Nine showed scars about the mouth; all had enlarged glands; two had lesions of the nose. No throat lesions were found. Chorea was present in two cases. It would appear from this investigation that heredo-syphilis is not a very common affection in school children, though it must be looked for by the school examiner.

Percussion in Pleural Effusion in Children.—FRANZ HAMBURGER (Wien. klin. Woch., Apr. 5, p. 402). In 1902 Grocco described a sign of pleural effusion which consisted in the appearance of a triangular area dulness on the posterior surface of the thorax on the opposite side to the effusion. The inner side of the right-angled triangle coincides with the spines of the vertebræ, and the base with the lower limit of pulmonary resonance. The base varies from 1 to 2½ in. in length according to the size of the effusion. The outer side of the triangle is formed by a line joining the outer end of the base with the middle line opposite the upper limit of dulness. This "paravertebral triangle of Grocco" had previously been described in lectures by Rauchfuss as occurring in children with pleural effusion.

Experiments were made by Baduel and Siciliano to explain the appearance of dulness on the sound side, which seemed to show that it was partly due to displacement of the mediastinum on the effected side. The displacement of the mediastinum is more pronounced, and the paravertebral triangle is more marked in right pleural effusion than in left. This is probably due to the fact that the oarta is normally somewhat to the left of the vertebræ, and is more easily displaced to the left than the right. But both Baduel and Siciliano and Rauchfuss agree that mediastinal displacement is not the only factor.

Dr. Hamburger confirms the constant presence of this paravertebral area of dulness on the sound side in children with pleural effusion, although he is not satisfied as to its strictly triangular outline. He states that equally constant with paravertebral dulness on the sound side is an area of relative resonance, which occupies a corresponding position on the side of the effusion. The note over this area is duller than that over Grocco's triangle, but is resonant compared with the completely dull note over the outer part of the thorax (*"relativ aufgehellter Schall"*). This paravertebral area of less intense dulness has long been known to Prof. Escherich, who insists in his lectures on the necessity, when pleural effusion is suspected, of percussing with special care the posterior parts of the thorax furthest from the vertebræ.

In every case of pleural effusion in children 4 zones of varying dulness are present on the posterior surface of the thorax; these are not sharply defined, but merge one in the other:—(1) The external part of the sound side is completely resonant; (2) the paravertebral area on the sound side is slightly, though distinctly, dull; (3) the paravertebral area on the side of the effusion is duller than that on the sound side, but resonant compared with the absolute dulness of (4) the outer part of the affected side. To elicit these various shades of dulness or resonance somewhat firm and deep percussion is required, and they are not evident on superficial percussion.

The original theory of Williams that pulmonary resonance was due to the vibrations of the thoracic wall, was displaced by that later propounded by Skoda that it was due entirely to oscillations of the air in the subjacent lung. Magonn, a Russian, in 1852, conclusively showed that both factors were concerned, just as when a drum is struck the vibrations of the parchment are communicated to the air beneath it in the cavity of the drum. If during percussion a hand is laid flat on the thoracic wall at some distance from the percussed spot, the previously full, normal pulmonary resonance becomes shorter, higher pitched, and softer, *i.e.*, is replaced by comparative dulness, because a large area of the thoracic wall is prevented by the hand from vibrating. The remainder of the thoracic wall is thrown into shorter oscillations, just as the note of the violin is higher the shorter is the string. This experiment proves the rôle of the thoracic wall, and the importance of the superficial transmission of oscillations. The latter has recently been entirely neglected and only the deep transmission of vibrations, *i.e.*, to the parts immediately beneath the thoracic wall percussed, has been considered. The fact that the note is louder on forcible than on gentle percussion, is due to the greater extent of the parts thrown into oscillation both superficially and deeply—not merely deeply as was supposed by Skoda. This fact explains both the paravertebral area of dulness on the sound side and the paravertebral area of comparative resonance on the affected side. For when the thorax is percussed near the vertebræ on the affected side the vibrations are transmitted through the vertebræ to the thoracic wall on the sound side, whereby dulness is diminished, but if the corresponding area on the sound side is percussed the vibrations, owing to the effusion, are not transmitted to the opposite side and comparative dulness results. That this explanation is correct is proved by the fact that the area of comparative resonance on the side of the pleural effusion is replaced by absolute dulness if the thorax on the sound side is compressed and thus prevented from vibrating. It also explains why the differentiation of areas is possible only on more or less forcible percussion. For on gentle percussion the vibrations are not transmitted to the opposite side of the thorax.

The transmission of vibrations across the vertebral column, from one side of the chest to the other, also explains the shape of the outline of the upper limit of dulness in pleural effusions, which is higher in the axilla than near the spine. The triangle included between the middle line, a horizontal line joining the highest point of the dulness and the middle line, and a line joining the highest and lowest points of the upper limit of dulness, is sometimes called "Garland's triangle." The resonance over this area is not, as is usually supposed, due to a difference in level of the upper surface of the pleural effusion or to the presence of compressed lung in this position, but merely to transmission and consequent amplification of the vibrations from the thoracic wall on the diseased to that of the healthy side. These variations in the percussion tone in pleural effusion are demonstrable only in children, because the greater elasticity of the thoracic walls in them allows of more intense oscillations.

Pyelitis in Infancy.—HENRY ENOS TULEY (St. Louis Med. Rev.). The importance of urinary examination as a diagnostic aid in diseases of adults, says the author, is generally conceded, but its employment in diseases of infancy and childhood is much too frequently neglected. The chief object of his paper is to call the attention of this important body to a rather unusual condition in infancy, viz., pyelitis, the diagnosis of which is entirely dependent upon a chemical and microscopical examination of the urine. There are many difficulties attendant upon urinary examination in infancy, but they are by no means insurmountable. The chief difficulty lies in the fact that a sample of uncontaminated urine, in the majority of cases, is most difficult to obtain from infants, but persistence is always rewarded. In male infants a loosely attached rubber condom to the penis, and this carefully held in place by a loosely applied napkin, is both effectual and practical. In female infants several drachms can be obtained by applying a large piece of absorbent cotton to the vulva and holding this by a rubber napkin applied next the skin. If there is an evacuation from the bowels at the same time, the sample is contaminated and another attempt should be made. Most infants are taught at an early age, by methodical and painstaking mothers, to use a vessel by being placed at regular intervals upon the vessel or chair. When a sample of urine is required for examination a repetition of this procedure will generally be successful in obtaining a liberal supply. The employment of catheterization in infancy, except as a last resort, is not to be considered.

Pyelitis, he says, may occur as a primary affection, the inflammation being limited to the pelvis of the kidney, or there may be an accompanying cystitis, the latter in such event being the primary condition. It may be caused by a calculus lodged in the pelvis of the kidney or it may occur as a sequel to any of the exanthemata, diphtheria, or typhoid fever. Another cause which is more frequent is an infection by the colon bacillus. This mode of infection occurs more frequently in female infants, there being an excursion of the bacilli through the urethra, with or without a coincident cystitis. It is entirely possible for there to be an infection through the medium of the blood. When the infection has occurred through the urethra it is usually following a diarrhea. The symptoms of pyelitis in infants are obscure. The child may be reported as having had a chill, or as having shown evidences of a chill by a blueness of the face and cold extremities followed by high fever. The temperature generally reaches 105 deg. to 106 deg. F. The chill may be repeated, though it generally is not, and the temperature is fluctuating and persistent. The attack may be ushered in by vomiting, or an attack of diarrhea, when this occurs as a sequel to that condition. If cystitis is the primary affection, there is painful and frequent urination, but if cystitis is not present there is usually no pain. There may be tenderness, however, over the loin or upper abdomen, if the inflammatory process is very extensive. The rise in temperature usually continues and no diagnosis is made until after a urinary examination. The urine is highly acid as a rule, a heavy precipitate is found, albumin is present in quantities dependent upon the amount of pus present, and a microscopical examination shows the urine loaded with pus corpuscles and epithelia. The epithelia are of various shapes, but those of the pelvis of the kidney and ureter predominate.

A Study of the Stools of Breast-fed Infants in Relation to the Presence of Starch Enzyme.—Kerley, Mason and Craig (Archives of Pœdiatrics, July, 1906). During the last 18 years the authors have been in the habit of using cereal gruels in infant feeding, both as an adjunct to a milk diet and as a substitute of milk in cases of illness, particularly in summer diarrhea. The feeding of hundreds of infants with cereal decoctions in the above manner has given results more satisfactory than we have been able to obtain by other methods. The statement frequently made, but unsupported by proof, that cereal gruels cannot be digested by the very young, hence are useless or harmful, was not in line with our observations, and suggested an investigation which we hoped would give something more definite than impressions from clinical observations. The study was undertaken at the New York Infant Asylum, and consists of two parts, first of a series of examination of the stools in starch-fed infants under one year of age. The complete work covers 324 stool examinations on 60 exclusively starch-fed infants, boiled barley flour in amounts from 142 to 1,560 grains being given. As a rule from 400 to 500 grains in 24 hours was the amount used. In testing for starch in the stools, the Von Jaksch iodine method was employed. In 33 infants the stools were persistently negative, five examinations being made on five successive days; of these, 11 were under 6 months of age. Seven were persistently positive, showing starch in considerable amount at each examination. In 20 the examinations were sometimes positive, sometimes negative. It was concluded, judging from the examinations thus made, that 41 infants showed a good starch capacity and 19 an indifferent or poor starch capacity. That some of the starch may have undergone fermentation in the intestine is, of course, possible. That it was not a factor of great consequence is proven in that the patients did not evidence any more bowel distension than usual; dextrin was present at times in more than one-half the cases, showing a partial conversion due to the presence of a starch enzyme, and, further, the children were maintained in fair nutrition during the period of the exclusive starch diet. Several of the starch-fed infants in which the stools were negative to iodine were delicate and of a very tender age. This led us to undertake a study of the stools of infants fed exclusively on the breast, with a view of determining if possible the presence of starch enzyme or enzymes in the feces, 161 tests being made of the stools of 26 children. The ages were, under two weeks, 22; between one and two months, 3; one, the oldest child, was 2½ months old. (The tests are then described in detail.) In every case the presence of sugar was indicated, proving the presence of a something in the feces which transformed the starch into maltose. The observations agree with Von Jaksch, who proved a starch-converting ferment in 28 out of 30 cases, and with Moro, who proved the same in 38 out of 40 cases. It was found that the converting capacity of the feces for starch was in the proportion of one grain of feces to about 1-20 grain of starch, this amount being required for the complete conversion of the starch into sugar. In one case there was a capacity of but 1-60 grain of starch to 1 grain of feces; in three, 1 grain of feces converted 1-10 grain of starch. When stronger starch solutions were used there was a response to both Lugol's and Fehling's solution, showing a partial conversion. In three the examinations began on the day of birth and were continued for several days, four examinations being made in each. Six were commenced on the second day and continued for four days. One premature baby eight months old, which lived six days and weighed 4 lb. 4 oz., showed a power of conversion of 1 grain of feces to 1-32 grain of starch. The authors satisfied themselves that the conversion of the starch was not due to feces bacteria by testing the stools for starch ferment after filtration through a Berkefeldt filter. The filtrate contained the ferment in abundance, but no bacteria. Feces bacteria and the ptyalin of the saliva being excluded, it would seem that the succus entericus and the pancreatic juice were responsible for the very active diastatic ferment. Zweifel and Korwin were unable to extract a diastatic enzyme from the pancreas in infants under three weeks old, and concluded that none existed. Their methods cannot be accepted at the present time in establishing the point, as the glands were macerated and placed in distilled water, in some instances for not longer than half an hour, and then mixed with a strong starch solution. Moro followed out the same method, but macerated for a much longer time. Among ten infants under 3 months of age he proved a diastase in the pancreatic extract in seven. In two of these the infants died at birth. One was 14 days old at death. Four were between 1 and 3 months of age. We now know that much stronger extracts are to be obtained, if the organ be cut up in small pieces, ground with sand in a mortar, and macerated in solutions of 15 per cent. alcohol or 40 per cent. glycerine. Furthermore, it is not fair to compare the active functionating pancreas with the dead organ. The claim that the diastase might be furnished by the mother's milk is disproved by the fact that the feces from meconium stools were as active before breast-feeding as after.

Salicylate Poisoning in Children.—F. LANGMEAD (Lancet, June 30, p. 1822). In the Harveian lectures for 1903, Dr. Lees strongly recommended salicylate of sodium in rheumatism and deplored the inefficient way in which it was given. He gives enormous doses from 100 to 300 gr. daily to children aged from 6 to 10. He believes that by gradually increasing an initial small dose he can give large doses without producing toxic effects. The writer watched several of his cases and never saw deafness or tinnitus, and even after the largest doses the patients were bright and cheerful. Dr. Lees, however, mentioned one case in which symptoms like those of diabetic coma arose. These he looks upon as evidences of acid poisoning such as occurs in that condition and in consequence gives with the sodium salicylate double the dose of bicarbonate of sodium as a prophylactic. The symptoms of acid poisoning are drowsiness, deepening into coma, and if untreated, ending in death, and air hunger of the Kussmaul type increasing with the drowsiness. The child is flushed, the eyes are bright, and there is usually great thirst. Vomiting usually, but not always, precedes these symptoms. The drowsiness may replace, or be associated with, delirium. The writer has observed these symptoms in 8 cases of rheumatism in children treated with salicylate. Acetone was always found in the urine in large amount. It was not found in the urine of patients taking salicylate who showed no toxic symptoms. In the more severe cases the sweet odor of acetone was evident in the breath. This group of symptoms does not seem to be generally recognized as occurring during salicylate treatment. However, as long ago as 1882 Quincke spoke of a "salicyl-dyspnea" resembling that of diabetic coma. Dr. F. J. Poynton, too, groups it among the symptoms to be watched for in rheumatic cases treated by this drug.

Scarlatinal Otitis.—SPRAGUE (Amer. Journ. of Med. Sci.) shows that otitis is the most frequent, and perhaps the most serious, complication of scarlet fever, occurring as it does in three to nine per cent. of cases, and of these about half are bilateral. Clinically there are three forms: (1) Acute serous, which appears about the time of the eruption or within the first ten days, or while the prodromal pharyngitis is active. The external meatus is somewhat red and swollen, and the tympanum may be congested and bulging. Probably most of these simple cases become secondarily infected and continue on into the purulent form. (2) Acute suppurative, occurring usually about the second week and accompanied in some cases by evidence of cerebral irritation. The canal is scaly, thickly coated at its entrance with wax, and often swollen; the drum is edematous and inflamed, and bulges markedly even after perforation has taken place. (3) Acute necrotic, sometimes called the diphtheritic form, though the Klebs-Loeffler bacillus is not found. The tympanum and middle ear are destroyed in the course of a few days, and even the internal ear is involved, causing a total destruction of hearing. In other cases the infection may damage the auditory and facial nerves, and lead on to meningitis and death. The appearances are those of an intense suppurative form with a membranous deposit on the drum, if the case is seen early, or in the middle ear. The fetid odor of necrosis is also characteristic. The cause of the otitis is generally a streptococcic infection, which frequently becomes a mixed one in a week. The milder forms may arise by way of the Eustachian tube, but the severe are probably hematogenous. Prompt treatment materially affects the prognosis, but the presence of adenoids and enlarged tonsils is of bad import. Treatment is surgical and antiseptic. With perforation in the serous form the ear should be swabbed out and not syringed, so as to avoid the possibility of a secondary infection; in the case of suppuration frequent syringing should be employed. Irrigation of the throat and nose is not recommended, as infection may be washed up the Eustachian tube to the middle ear. In the event of mastoid inflammation the author prefers to wait, unless the indications are urgent, until desquamation is complete, as he finds that otherwise repair is extremely slow and that absorption from the wound may take place. An important point is that the discharge from a scarlatinal otitis appears to be a means of spreading infection. The quarantine of such cases should be prolonged in consequence.

Pseudo-Coxalgia in Anal Fissure in Children.—M. SVEHLA (La Presse Médicale, Mar., 1906, No. 25, p. 197, and Jahrb. f. Kinderheilk., 1906, vol. xiii., p. 187) shows that these fissures and excoriations are capable of producing symptoms similar to those of early coxalgia. For example, a child, aged three years, usually constipated but without hereditary antecedents, complained for three days of pains in the right foot. He would neither walk nor hold himself upright, stating that in this position his hip hurt him. Examination gave a negative result, but on making him walk it was noticed that he limped and dragged his right leg and avoided leaning upon it. The limb was not painful anywhere on palpation, the joints were free, and all movements effected with ease. Exploration of the anus discovered that the ano-rectal mucous membrane was red and swollen, and the sphincter contracted powerfully with pain 'round the exploring finger. Laxatives, sitz baths, and cocainized vaseline were prescribed. Eight days later there was no trace of inflammation and the lameness had disappeared. Another child, aged seven years, had pain on walking, immobility of the right leg, the hip raised, and compensatory scoliosis of the lumbar spine; movement of the coxofemoral joint was painful, and percussion on the heel and on the great trochanter gave rise to pain in the hip. A similar condition to the previous case was found at the anus and cure resulted from the same kind of treatment. The twelve cases published by M. Svehla call for an explanation of the mechanism by which such symptoms are produced. These lesions are usually very painful, the child instinctively seeks a position of ease, and to avoid the rubbing together of the nates flexes one of his lower limbs, with adduction and internal rotation, so as to separate them. Blows on the heel and trochanter indirectly induce this painful rubbing of the nates, and the child, who does not accurately localise his sensations, refers the pain, not to the anal region, but to the hip. In children the anal region should be explored in all cases of difficult diagnosis of this kind.

Alimentary Intoxication in Infants.—FINKELSTEIN (Jahrb. f. Kinderheilkunde, Vol. 65, No. 1). The author relates his experiences in years of research on this subject, with special regard to the collapse, disturbances in consciousness, peculiar change in the rhythm of respiration, alimentary glycosuria, fever, diarrhea, albumin and tube casts in the urine, abrupt decline in weight and leucocytosis. The presence of these nine factors in the clinical picture is indispensable for the conception of what he entitles "alimentary" intoxication. The leucocytosis approaches but seldom reaches 30,000. The respiration is deeper and faster, and the gestures, instead of the "angular," rapid movements of health, become rare, languid and "rounded"; the corners of the mouth are drawn down; the arms and legs take unusual positions, sometimes stretched out, sometimes drawn up, relaxed or rigid. The lower blood pressure brings a livid tone to the complexion, with shadows around the eyes. It is important to see the child at rest to detect this intoxication in its incipiency; when the child is aroused these signs alter. The stools may be approximately normal even with these symptoms of serious intoxication. The sugar in the urine and the deep breathing differentiate this intoxication from the numerous infectious diseases which may be accompanied by some of the other signs. He suggests that these two signs may also prove useful for differentiating in adults brain affections from disturbances due to autointoxication, such as acetonemia and dyspeptic coma. In infants the appearance of the pathognomonic symptom-complex is an indication that a new specific process is going on in the organism. It is liable to be followed by specific, profound modifications of the metabolism. All the functions suffer, as he relates in detail. The intoxication is the expression of a regular reaction of the organism which always occurs when injury from any cause, such as an infectious affection or process or any deleterious influence, reaches a certain intensity. The intoxication is not the work of bacterial toxins, but of metabolic toxins; a sharp distinction should be made between them in this respect. Research is needed on the nature of the substances inducing the intoxication. The conditions are somewhat similar to those observed in uremia.

Later Development of Chlidren Who Have Had Convulsions During Infancy.—THIEMICH AND BIRK (Jahrb. f. Kinderheilk., Vol. 65, No. 1). These authors have traced the later history of 64 children known to have had convulsions in infancy. The only similar work which they have found in the literature was Bullard and Townsend's article in 1901, and this does not distinguish between the various kinds of convulsions, but lists all that are not true epilepsy. By "eclampsia infantum" Thiemich understands epileptiform convulsions, of the entire musculature, sometimes occurring in series, but lasting only a few minutes each time, with loss of consciousness, and, during the intervals, marked signs of "spasmophilia," such as tetany, laryngospasm, with the Trousseau or facial sign, or morbidly increased electric excitability. In the 64 cases reported, the onset of the eclampsia always followed metabolic disturbances. Only 2 of the children were even partially breast-fed. Dietetic measures were the main reliance in treatment, supplemented usually by phosphorus cod-liver oil. In 37 per cent. heredity was an unmistakable factor in the convulsions, and in 13 per cent. there was neuropathic heredity—a total of 54 per cent. of proven heredity. No instance of epilepsy was found in the parents or family of any of the children. Two-thirds of the children were found later to be below the average of intelligence or morals, and some of the others are only children. The writers add that the fact of being an only child, as is well known, affords a predisposition for nervous affections. An only child sometimes is helped at home with his studies, thus enabling him to be rated as normal at school—to the child's great disadvantage, as he succumbs sooner or later to the mental strain. Many an early maturing only child, who ranked high in his early school life, falls far below the average later, if he does not end as a "psychopath." The later development of the children with laryngospasm alone did not differ in any respect from that of the children with pronounced eclampsia. Only a very small percentage of the eclamptic infants developed into normal children.

BOOK REVIEWS

HYGENIE ET PATHOLOGIE CUTANEES DU PREMIER AGE. By PAUL GASTAN. Maloine, Paris, 4 fr.

Dr. Gastan's monograph on the skin diseases of infancy, which appeared first in the second volume of de Rothchild's series on "Traité d'Hygiene et de Pathologie du Nourrisson," is now published under separate cover. The title of this work is somewhat misleading, as the book is largely a study of the skin diseases as they are seen in infancy, from the purely clinical side, the pathology receiving very little attention. The first ten chapters are devoted to a general consideration of the subject, and include what is perhaps the most valuable chapter in the book, from the standpoint of the general practitioner or student, on the hygiene, prophylaxis and general care of the baby's skin. The author takes a broad view of the subject and is carried far from the skin in his pursuit of etiological factors. The greater part of the book is devoted to the symptomatology and treatment. Each disease is taken up separately and is tersely and graphically presented. There are numerous photographs, which at least serve to show the location of the lesions. Perhaps it is unfair to expect much more from photography. The appended table, classifying the lesions, should prove of help in diagnosis.

MOVABLE KIDNEY. A CAUSE OF INSANITY, HEADACHE, NEURASTHENIA, INSOMNIA, MENTAL FAILURE AND OTHER DISORDERS OF THE NERVOUS SYSTEM. A CAUSE ALSO OF DILITATION OF STOMACH. By C. W. SUCKLING, M.D. (Lond.), M. R. C. P., 1905.

The preface of this small volume is devoted to a rather vehement assault upon Professor Osler for the statements he makes in the article on movable kidney in the 1905 Edition of his Principles and Practice of Medicine, and is very much to the disadvantage of the comparatively little known, though prolific writer.

In the first chapter, Some Literature on Movable Kidney, there are but 10 references to literature, mostly quotations from Dr. Goelet, of New York: a very poor symposium on the literature that really exists.

To movable kidney, or dropped kidney, as he chooses to call it, this writer attributes the most varied phenomena, insanity being the most bizarre, and he says, "If a patient is insane and a movable kidney exists, that patient should be operated on at once."

The theory of the cause of these various disorders is unique. The author supposes that there is a kinking of the ureter which causes the urine to be dammed back and a consequent absorption of toxic products into the blood. He seems to lose sight of the fact that such a kinking would give rise to an intermittent or constant hydronephrosis, and that such conditions are by no means common in comparison with the group of symptoms he mentions as a result.

Dr. Suckling's indiscriminate advice for operation includes all cases except those over sixty years of age, and those of serious organic disease of any nature, but no exception if there are mental symptoms, his reasons being that there is no mortality, that operation, rightly done, cures, and that insanity is so to be dreaded if let alone.

The author's logic throughout is seriously at fault. He loses sight of the fact that two pathological conditions can exist in the same body at the same time or subsequently without being related as cause and effect. "Proptu hoc," or rather, "Cuen hoc, ergo proptu hoc" is apparently his motto.

Frankly, the book is entirely too radical, the statements are for the most part unsupported by good evidence, many of the cases of cure reported being under a period of 18 months.

It is safe to say that the book does not meet the views of the leading gynecologists or neurologists and psychologists of America.

LA SCROFULE: TERRAIN SEPTICO-PYOHEMIQUE HEREDITAIRE OU ACQUIS ET DIATHESE LYMPHOIDE PRE-OU POST TUBERCULEUSE. By PAUL GASTON. Maloine, Paris. 3 fr.

The old conception of scrofula was that of a constitutional disease, usually hereditary and especially affecting the lymphatic system, though often associated with lesions of the eyes, ears, mucous membranes, etc. With the improved methods of diagnosis it was seen that many cases previously regarded as scrofula were in reality various manifestations of tuberculosis and syphilis. The term has come to be applied almost exclusively as a synonym for tuberculous adenitis. Gaston proposes to apply this term to a morbid condition of the lymphatic system, brought about by chronic infection, and predisposing to infection by the bacillus of Koch. The work under consideration is not only an effective argument for such a nomenclature, but is incidentally a very satisfactory exposition of the various morbid processes involved. It is illustrated by a number of photographs and several excellent drawings in color.

PEDIATRICS

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ORIGINAL ARTICLES

SPASMOPHILIA.

By John Zahorsky, M.D.,

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The immense amount of clinical research in regard to the spasms and convulsions of infants, which has been going on for several years, has finally terminated in the adoption of a new concept, which to the practicing physician must be very important. Reference is made to that large group of symptoms known as tetany, carpal spasm, carpopedal spasm, laryngospasm, eclampsia, etc., which have been found to occur in infants suffering from some malnutrition—notably, rickets. Heubner has applied the term spasmophilia to this group of related conditions, which is to be preferred to hypertarachia, as suggested by Baginsky. The term spasmophilous diathesis, which Thiemich uses, also fits in very well with our modern terminology.

Spasmophilia, then, is that diseased condition of infancy which is characterized by a hyperexcitability of the nervous system to mechanical, especially electrical stimuli, and depends on some derangement of nutrition. The clinical syndromes of carpopedal spasms, eclampsia or laryngospasm are only different phases of the same disease. Sometimes the disease is latent and its presence can be determined by the electrical test only (Erb's phenomenon), or by applying mechanical stimuli (Chvostek's or Trousseau's sign). The tendon reflexes show no change. These forms of nervous hyperexcitability in contradistinction to those depending on some developmental or toxic disease have their origin in the diet.

It has long been recognized that patients suffering from infantile tetany or laryngospasm usually show evidences of rickets, and so the postulate has been laid down that both diseases depend on the same underlying cause. Probably, the theory of Kassowitz that tetany is caused by a hyperemia of the meninges and cerebral cortex collateral to the congestion of the cranial bones is entirely gratuitous and unfounded. It was this same author, however, who discovered the interesting fact that tetany occurs in the late winter and early spring months in the largest majority of cases, a peculiarity which does not entirely agree with rickets and for which no explanation has been offered.

Sabbatani, years ago, demonstrated that a diminution of the lime in the cerebral cortex increases the electrical excitability of the nervous system, and it is possible, as has been surmised, that the nerve tissue as well as bone and muscle suffer in rickets, to a varying degree in different individuals.

A hereditary predisposition, as in the case of rickets, has been distinctly traced in many cases, but it is doubtful whether this factor needs to be considered.

Of great practical interest, however, was the discovery of Finkelstein that the electric excitability of the nervous system could be quickly diminished by the total withdrawal of cow's milk and the substitution of some cereal. The laryngospasm, too, usually ceased abruptly. This fact was most carefully studied and has since been corroborated by many observers, as Japha, in Neumann's clinic, by Mendelsohn and others. True, this connection is not invariable, in some cases the clinical symptoms do not disappear at once, but the favorable effect is too apparent in most cases to admit of doubt.

Finkelstein, furthermore, determined that the harmful effect of cow's milk is not found in the casein fat or sugar but in the milk serum—that is, whey; a very important finding in view of the fact that it has become the custom to use whey in many of the indigestions of infancy. One deficiency appears in the researches of Finkelstein and that is the relative influence of raw or boiled milk in the production of spasmophilia. As is well known, the Americans lay great stress on the tendency of Pasteurized and sterilized milk to produce rickets. Dr. E. W. Saunders, for example, was one of the earliest to call attention to this relation and many other American writers believe that there is such a connection. The English writers, too, *e.g.,* Pritchard, prescribe raw milk for children suffering with rickets. At the Bethesda Foundling Home for many years we have traced a relationship between boiling the milk and rachitis. This has been too frequently observed to admit of any doubt. Most of the cases of spasmophilia in private which I have seen have been in infants who have been fed on condensed milk for a prolonged period.

It is difficult to reconcile this experience with that of some French writers, *e.g.*, Variot, who sterilize the milk by prolonged boiling and yet do not discover any great tendency to rickets among the babies. In the Gouttes de Lait under the care of Variot, the milk is apparently boiled to death, as we would say, and yet he has the temerity to assert that no nutritive disorders follow.

Personally, the conviction that heating milk is one factor that predisposes to both rachitis and spasmophilia only becomes deeper as my experience goes. I will take the liberty to report a recent case, which illustrates several points which I desire to emphasize.

E. L., aged 7 months, was first seen by me February 14, 1906. The boy had been breast-fed only a few days, when, on account of ill health of the mother he was placed on substitute feeding. Condensed milk was the first food administered for a few days only and then replaced by a modification of cows' milk. This brought on a severe indigestion, and the physician in charge placed the baby, when about 2 months old, upon malted milk. He was still taking this food when I first saw him and apparently thrived on it.

About 2 weeks before my first visit the little patient began to have "choking spells." When he was excited he would suddenly have difficulty in breathing and inspiration was accompanied by a very loud crowing sound. These attacks, at first attributed to cold, gradually became worse and sometimes became alarming. A few days before, the infant began to have eclamptic seizures, some having their onset in the laryngospasm, others apparently independent of the throat trouble. The infant would become rigid, the eyes fixed, the hands clenched and the skin cyanotic. He had 8 to 10 convulsions daily. Some were prolonged. Medicine which had been prescribed for them seemed to do no good.

Examination revealed a very pale well-nourished infant. No teeth had appeared. No tenderness was found anywhere, but the rachitic rosary was well marked. No hemorrhagic spots were found. The internal organs were all normal as far as could be ascertained by physical examination. Chvostek's phenomenon was very marked and immediately served to corroborate the diagnosis of tetany or spasmophilia. Trousseau's sign was not present, neither was a tonic carpopedal spasm noticed. The electrical reaction, unfortunately, was not made. The patellar reflex was normal.

As the infant had difficulty in digesting cows' milk previously, I concluded to be cautious in placing him on substitute feeding and, consequently, I advised adding one-half ounce of fresh, unheated cows' milk to each bottle of malted milk. Orange juice was also prescribed. As a general tonic the compound syrup of phosphates was ordered. On the following day there was no change in the child's condition, the spasms had continued in spite of full doses of chloral and bromid. The milk in the food was slightly increased and meat juice ordered to be administered.

The milk was gradually increased and on the fifth day of treatment, as the child was constipated, the malted milk was entirely discontinued and an alimentation of oat meal-water and milk, equal parts, was given. In order to prevent the hard coagulation of the casein, citrate of soda, according to Poynton's method, was used. No more general spasms occurred 3 days after the milk and tonics were given. The laryngospasms had also very much improved, but he continued to have occasional attacks for several weeks. Chvostek's sign could be elicited after two months. The nutrition improved very much, the evident signs of rickets also yielded in this time. Altogether, the convalescence was rather slow as far as the spasmophilia was concerned. The irritable nervous system kept pace with the general condition. It could not be denied that while a noticeable amelioration of the spasms ensued after 2 days of the diet, no such brilliant results followed the total withdrawal of milk as has been observed by Finkelstein. Still, in general this case teaches that while milk in the form of the sterilized malted milk and condensed milk may induce tetany, the addition of some fresh, unheated milk tends to improve the spasmophilia. It must be repeated then that the German school has overlooked this point and has not made the proper distinction between this class of foods.

I can recall at least two infants suffering from rickets and spasmophilia who had been fed on condensed milk and in each instance the nervous irritability promptly disappeared on placing the baby on a whey and cream mixture.

When we consider that tetany is very frequent in Germany, judging from the published cases, and connecting this with the fact that boiling the milk is universally practiced in that country, the question naturally presents itself whether or not an etiologic relation may not be discovered between boiled milk and spasmophilia. It is really remarkable how numerous are the deaths reported in the German clinics caused by laryngospasm.

Mendelsohn and Kuhn (*Arch. f. Kinderheilkunde,* Bd. 44, page 86) also traced an apparent relation between the milk and the spasmophilia. Several cases of laryngospasm were promptly relieved by discontinuing the milk. One infant had a recurrence which ended fatally when the mother gave a milk mixture. Several of their cases did not improve so promptly when the milk was discontinued, and a tendency to a recurrence of the severe attacks was observed even in infants kept entirely on a cereal decoction. How easily can one be mistaken in regard to inferences drawn from clinical symptoms is obvious from the history of one of his cases:

An infant with severe attacks of laryngospasms was given a cereal mixture (kindermehl) and the spasms almost disappeared. On the seventh day a violent relapse occurred which proved fatal and yet there had been no change in the treatment. Had a milk diet again been instituted the deplorable result would have been ascribed to that article of food. Nevertheless the authors mentioned recommend that in every case of severe laryngospasm a trial of discontinuing milk for several days should always be made.

Contrary to the findings of Finkelstein and Japha, Mendelsohn and Kuhn found a diminution of Erb's phenomenon (electric hyperexcitability) only in the minority of cases when the feeding with cows' milk was discontinued. Moreover, Chvostek's and Trousseau's phenomena were favorably influenced in a small number of cases only, most cases showing little improvement. Hence, they conclude from a study of their cases that the influence of a diet of cows' milk is less striking in cases of latent tetany than in laryngospasm.

In such a confused state is our present knowledge concerning this interesting disease; but whatever the ultimate decision, we owe a debt to Finkelstein in calling attention to the interesting phenomenon that the hyperexcitability of plasmophilia is increased by milk. Personally, I am still skeptical that fresh, clean, unheated milk will have such a result, but more study is necessary to decide this point.

The treatment of the severer forms of tetany in the light of our present knowledge may be summarized as follows:

Stop the milk for a few days and give a cereal decoction. Add egg albumen or human milk to this decoction in a few days if laryngospasm is marked. It most cases clean, unheated cows' milk can be safely added after the third or fourth day. Do not use whey mixtures. Other well-known measures to combat the rickets should always be employed.

Meanwhile, it is well to bear in mind the question: Does heated or unheated, fresh or infected cows' milk affect the hyperexcitability of tetany? A few clinical observations with these points in mind would aid materially in formulating a rational diet in dangerous cases.

In conclusion, attention may be called to the heated controversy recently inaugurated by a study of Meyer of the Berliner school, in which he claims to have demonstrated that the ingredient of cows' milk which causes indigestion and toxic symptoms in the infant is not casein but the milk serum, that is, whey. In view of these opinions clinical observations on infants fed on whey mixtures are in order, as some definite light on the toxic principles of bovine milk would have an immense practical value.

A CASE OF MASTOIDITIS IN A BOY OF 13 YEARS: OPERATION FOLLOWED BY ATTACKS OF PURPURA: RECOVERY.

By William C. Braislin, M.D.,

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A boy of thirteen years was referred to me by his physician on April 25, suffering with severe pain in the ear and over the mastoid region. The drum was incised; calomel in repeated doses up to one grain, and magnesium sulphate were given.

The preceding history elicited at this time was that he had been a mouth breather for two years. During this time he had suffered with repeated sore throat and attacks of vertigo, the constant obstruction of the nose being very noticeable. Five days ago with an attack of "sore throat" he had high fever. An atomizer and spray solution had been employed, immediately following the first use of which pain in the ear began. For the past two nights he had been somewhat delirious, less on the night just past, though pain in the ear and a beating tinnitus continued.

The night following the treatment instituted by the writer he passed very uncomfortably, and seemed but little better. There was some external swelling of the mastoid. In the afternoon a mastoid operation was performed. An operation for the removal of the adenoid enlargement in the naso-pharynx had been repeatedly suggested by the family doctor, and at the time of operation the mother requested that the operation on the throat be done under the same anesthesia, since she believed she would never have courage to consent to it later; we therefore agreed to do this.

Operation: The ear is prominent through edema of the soft parts. Bone unperforated before operation, but congested, the bone-cells filled with bloody serum and coagulated fibrin. Pus in the antrum and adjacent cells. Very large adenoids removed at same anesthesia. Recovery from anesthesia was uneventful. Patient did well for three days.

On the evening of the third day the boy complained of itching on legs and feet, was restless and feverish. On examination the feet were found swollen and dark with extravasated confluent blood blotches; purpuric spots on legs below the knees and on the feet. The next day the swelling in the feet had subsided, but dark subcutaneous extravasations existed below the malleoli and at the tarsal joint. Non-elevated purpuric spots still visible on legs. These rapidly faded to a pale yellow color, but four days later a new crop of purple hemorrhagic spots appeared. Bichloride gauze was substituted for the iodoform; urine examination negative. Acidulated fruits were prescribed.

Four days later, on May 6, the boy felt chilly and miserable; pains in the ankles, knees and elbow joints, and later in the evening large purpuric spots appeared on the thigh, largest on the posterior aspect, some as large as a silver quarter-dollar, also on the legs and ankles, though less numerously about the ankles than in the previous attacks. On the full appearance of the purpura the boy felt better and was bright when seen next day. A subsequent attack three or four days later appeared similar to, though lighter than, the preceding. There were no further attacks and the wound healed in seven weeks.

Summary: Alarming symptoms and the appearance of purpura followed three days after a mastoid operation, at which time likewise an adenoid operation was performed. Other attacks of purpura followed on subsequent dates. The patient lost a considerable amount of blood at this double operation, at the time when an acute inflammatory process was proceeding in the middle ear. The removal of a large mass of adenoids left an exposed area of considerable size, capable of absorbing septic materials. The considerable loss of blood and the absorption of septic material from the pharyngeal wound favored, if they were not directly responsible for, the purpuric attacks.

The writer has frequently advised against operating for adenoids during the presence of acute or subacute inflammation of the pharynx and tonsils, and believes that the source of anxiety in the above related case would have been avoided by postponing until later the removal of the pharyngeal hypertrophic tissue.

INFANTILE MORTALITY AND ITS PRINCIPAL CAUSE —DIRTY MILK.

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I. INFANTILE MORTALITY RATES.

Although it is generally well known that the mortality among infants and young children is very high, it is not commonly recognized that much of it is due to causes which are avoidable, and to one in particular which can be effectively controlled by individual and concerted effort. In this country, the annual waste of infant life fails to attract the attention to which it is entitled, largely because of indifference and ignorance on the part of the public and of public authorities to the importance of registration of vital statistics, by which alone can be measured the influence exerted by the various conditions affecting the public health. With no knowledge of the numbers of births and deaths, and of the ages at death, there obviously can be no knowledge of the rate of infantile mortality; and consequently where this is high, but unrevealed, the public mind is not disturbed. Even where vital statistics are registered and the rates of infantile mortality are therefore known, it is far from being well understood how many lost lives might easily have been saved. In some places, however, in this country and abroad, where this waste and its cause have been properly emphasized and brought home to thinking people, much has been done for its prevention, and thousands upon thousands of lives have undoubtedly been saved thereby.

The registration States of the United States are few: excepting Michigan, Indiana and the following, which recently have been added, California, Colorado, and South Dakota, they lie east of Ohio and north of Virginia—a small corner which includes New England, New York, New Jersey, Pennsylvania, Maryland, and the District of Columbia. According to the Census of 1900, the infantile mortality per thousand births in what then made up the registration area was as follows:

Table I.

District of Columbia	274.5	New York	159.8
Rhode Island	197.9	Connecticut	156.8
Massachusetts	177.8	Maine	144.1

New Hampshire	172.0	Vermont	122.1
New Jersey	167.4	Michigan	121.3

One is struck with the difference between the highest and the lowest of these figures: the former is more than twice as great as the latter; and one can but wonder what figures from every State would show and how wide would be the variation between the highest and the lowest.

As infantile mortality figures run in foreign countries, these rates, high as they are, are not extraordinary. The highest about equals that of Russia, and is not much greater than that of Austria; Rhode Island makes a better showing than Germany and Italy, and almost as good a one as Holland and Spain; New Jersey's rate is practically the same as that of France and better than that of Switzerland; Maine stands with England and Wales and better than Belgium and Denmark; Michigan, the lowest in the list, stands with Scotland. Of European countries, but three,[1] Ireland, Norway and Sweden, have a lower rate than Michigan.

Outside the registration area, there are many cities and towns which collect their own vital statistics, and from their returns one can form some idea of what would be revealed were all of the States to adopt registration. The report of the Census of 1900 includes returns from no fewer than 106 cities and towns with infantile death-rates in excess of 175. In nine cases, the rate exceeded 300; in ten, it was between 250 and 300; in thirty-eight, it was between 200 and 250; and in forty-nine, it was between 175 and 200. These returns are shown in the following table:

TABLE II.

Charleston, S. C.	419.5	Plymouth, Pa	201.4
Savannah, Ga	387.5	Wilmington, Del	200.9
Mobile, Ala	344.5	Richmond Borough, N. Y.	200.4
Key West, Fla	311.8	Hudson, N. Y	200.0
Biddeford, Me	311.6	Albany, N. Y	199.6
Atlanta, Ga	306.0	Johnstown, Pa	199.2
Fall River, Mass	304.7	Reading, Pa	198.9
Lynchburg, Va	301.7	Brooklyn, N. Y	197.2
Richmond, Va	300.7	Vincennes, Ind	197.0
Laconia, N. H	294.6	Binghamton, N. Y	196.9
Shreveport, La	293.5	Sault Ste. Marie, Mich	196.9
Jacksonville, Fla	287.6	Jersey City, N. J	196.4
Norfolk, Va	284.6	Portland, Me	195.9
Lowell, Mass	275.5	Boston, Mass	194.1
Washington, D. C.	274.5	Traverse City, Mich	192.8
Petersburg, Va	265.1	Allentown, Pa	192.5
Nashua, N. H	261.2	Plymouth, Mass	192.1
Natchez, Miss	256.3	Borough of Manhattan	190.9

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[1] Ireland, average of twenty years, 1874 to 1893, 96.6; Norway, 1902, 75.08; Sweden, 1902, 107.

Alexandria, Va	250.0
Burlington, Vt	248.0
Salem, Mass	247.7
Memphis, Tenn	247.1
Lawrence, Mass	246.5
Carlisle, Pa	245.4
Saratoga Springs, N. Y	244.9
Steelton, Pa	244.6
Manchester, N. H	238.4
Owasso, Mich	237.3
Baltimore, Md	235.1
Woonsocket, R. I	233.8
Annapolis, Md	233.5
Wilmington, N. C	232.2
Lansingburg, N. Y	230.8
Troy, N. Y	229.5
New Orleans, La	229.2
Nashville, Tenn	228.9
Passaic, N. J	227.9
Leadville, Col	226.6
New Bedford, Mass	222.9
Augusta, Me	219.4
Watertown, N. Y	219.4
Atlantic City, N. J	215.4
Raleigh, N. C	215.4
Providence, R. I	214.9
Altoona, Pa	214.8
Phœnixville, Pa	206.7
Pottstown, Pa	204.1
San Antonio, Tex	203.9
Holyoke, Mass	203.4
Poughkeepsie, N. Y	202.6
Evansville, Ind	202.4
Detroit, Mich	201.2
Philadelphia, Pa	201.9
Waterbury, Conn	190.7
Paterson, N. J	190.5
Wilwaukee, Wis	190.2
Newport, Ky	189.8
New York, N. Y	189.4
Kansas City, Mo	186.8
Cambridge, Mass	186.5
Norristown, Pa	186.4
Auburn, N. Y	186.2
Dover, N. H	186.0
Elizabeth, N. J	185.6
Cleveland, O	185.5
San Diego, Cal	185.5
New Britain, Conn	184.9
Easton, Pa	184.4
Leavenworth, Kan	184.4
Mt. Carmel, Pa	183.4
Covington, Ky	182.8
Newark, N. J	182.0
Central Falls, R. I	181.5
Pittsburg, Pa	180.5
Phillipsburg, Pa	180.0
Pawtucket, R. I	179.5
Kingston, N. Y	178.8
Lawrence, Kan	178.8
South Bethlehem, Pa	178.7
Pueblo, Col	178.4
Hartford, Conn	178.2
Allegheny, Pa	178.0
Lima, O	177.8
Sacramento, Cal	177.7
Oskaloosa, Iowa	177.6
Columbus, Ind	177.2
McKeesport, Pa	177.0
Los Angeles, Cal	175.1

II. LEADING CAUSES.

It is unfortunate that while these figures reveal a most lamentable waste of infant life, no details are given from which one can determine its causes, and we are compelled, therefore, to have recourse to the statistics of other countries for an explanation.

In France, the average infantile death-rate for the twenty years from 1874 to 1893 was 167; in 1903 it had fallen to 137. In some cities the rate was very low, thus: Lyons, 110; Bordeaux, 112; Paris, 101. In fact, Paris had then and has now a lower rate than any large European city. In January, 1901, Balestre and Gilletta de Saint Joseph[1] presented to the Academy of Medicine a memoir on infantile mortality in France from 1892 to 1897, in which they showed that the chief cause of death was gastrointestinal diseases. Of each thousand deaths, 385 were due to this group, 171 to congenital debility, 147 to respiratory diseases, 50 to acute contagious diseases, 25 to tuberculosis, and 222 to all other causes.

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[1] M. Perret. Revue d'Hygiène et de Méd. Infantiles, 1905, iv., 160.

According to Dr. E. Ausset,[1] from 1897 to 1902, of every thousand infantile deaths in the Department of the North, 359 were due to diarrhœal diseases, 169 to congenital debility, and 160 to acute respiratory diseases. The following table shows the rate of diarrhœal diseases per thousand, which obtained in certain parts of the Department.

Table III.

District of Dunkerque	445.08
Canton Bergues	410.61
Canton Bourbourg	485.38
Canton Wormhoudt	602.86
Canton Gravelines	404.40
The 2 Cantons of Dunkerque	465.00
District of Lille	401.26
Canton Armentières	416.66
Canton Quesnoy-sur-Deule	420.28
Canton Seclin	383.37
Canton Lannoy	398.87
Canton Roubaix	464.33
The 3 Cantons of Tourcoing	457.77
The 8 Cantons of Lille	427.83
District of Hasebrouck	395.20
Canton Merville	363.60
Canton Steenvoorde	394.44
Canton Cassel	454.66
The 2 Cantons of Bailleul	431.11
District of Valenciennes	313.92
Canton Denain	342.10
Canton Condé	337.07
Canton Bouchain	392.40

Of the European countries, Germany stands second in high infantile mortality, being surpassed only by Russia, where in some districts the rate exceeds 500 per thousand births, and in the whole country it reaches 270. The German rates for the five years 1901 to 1905 were as follows: 216, 184, 202, 204, 204. They were especially high in Bavaria, Saxony, Saxe-Altenburg, and the Reuss principalities. In 1903, for example, the rates were as follows: Bavaria, 264; Saxony, 247; Saxe-Altenburg, 266; Reuss, elder line, 247; Reuss, younger line, 250.

In 1904, in the 323 German cities and towns having populations exceeding 15,000, the rate was 202; in 1905, it was 204.

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[1] Revue d'Hygiène et de Méd. Infantiles, 1905, iv., 433.

In the same year, the 42 cities with populations exceeding 100,000 showed a rate of 204, and in the twelve months ended June 30, 1906, one of 198. Table IV shows the number of births, the number of deaths under one year, and the infantile death-rates of each of these cities for both periods. Of 67,633 infant deaths, 28,422 were due to diarrhœal diseases.

TABLE IV.

	Number of births.		Deaths under 1 year.		Infantile death-rates.		
Place.	1904.	July 1, 1905, to July 1, 1906.	1904.	July 1, 1905, to July 1, 1906.	1904.	July 1, 1905, to July 1, 1906.	Difference.
Aachen	4,445	4,300	898	839	202	195	— 7
Altona	4,534	4,405	833	749	184	169	—15
Barmen	4,902	4,597	681	605	139	132	— 7
Berlin	48,842	49,708	9,782	9,993	200	200	
Bochum	4,060	5,060	718	818	177	162	—17
Bremen	6,294	6,429	1,072	1,116	170	174	+ 4
Breslau	14,357	14,366	3,393	3,511	236	244	+ 8
Brunswick	3,684	3,397	672	668	182	197	+15
Cassel	3,080	3,202	502	407	163	127	—36
Charlottenburg	4,703	5,189	811	803	172	155	—17
Chemnitz	8,178	8,314	2,509	2,253	307	271	—36
Cologne	15,137	15,373	3,435	3,266	227	212	—15
Crefeld	2,769	2,752	469	390	169	142	—27
Dantzig	5,209	5,288	1,143	1,286	219	243	+24
Dortmund	6,751	7,385	1,199	1,366	178	185	+ 7
Dresden	15,153	14,297	2,914	2,735	192	191	— 1
Duisburg	4,380	7,524	845	1,137	193	151	—42
Düsseldorf	8,524	8,868	1,736	1,667	204	188	—16
Elberfeld	5,151	4,963	796	739	155	149	— 6
Erfurt	2,765	2,960	574	597	208	202	— 6
Essen	8,061	9,494	1,325	1,498	164	158	— 6
Frankfort a. M.	9,146	9,355	1,458	1,446	159	155	— 4
Gelsenkirchen	7,541	7,451	1,335	1,169	177	157	—20
Halle	4,982	4,985	1,141	1,175	229	236	+ 7
Hamburg	19,883	20,471	3,321	3,538	167	173	+ 6
Hannover	6,550	5,908	1,100	949	168	161	— 7
Karlsruhe	3,137	3,052	656	565	209	185	—24
Kiel	4,817	5,083	837	903	174	178	+ 4
Königsberg	5,839	6,671	1,149	1,556	197	233	+36
Leipzig	14,739	14,734	3,576	3,273	243	222	—21
Magdeburg	6,372	6,304	1,611	1,472	253	234	—19
Mannheim	5,176	5,170	1,196	1,053	231	204	—27
Munich	16,743	15,787	3,831	3,432	229	217	—12
Nuremberg	10,182	10,290	2,707	2,547	266	248	—18
Plauen	3,744	3,745	859	779	229	208	—21
Posen	5,008	5,123	1,112	1,272	222	248	+26
Rixdorf	4,530	5,547	996	1,212	220	218	— 2
Schöneberg	3,021	3,200	459	480	152	150	— 2
Stettin	7,497	7,089	1,984	1,847	265	261	— 4
Strasburg	4,768	4,794	966	913	203	190	—13
Stuttgart	5,501	6,176	1,018	1,270	185	206	+21
Wiesbaden	2,370	2,489	347	403	146	162	+16
Total	332,525	341,295	67,966	67,637	204	198	— 6

From the very admirable registration returns, it is possible to determine the diarrhœal infantile death-rate of each city, and the per centage responsibility of the diarrhœal diseases in the production of the high general mortality. Table V presents these figures for the twelve months ended June 30, 1906.

In Table IV, it will be noted that one city, Chemnitz, had in 1904 the unenviable distinction of an infantile death-rate of more than 300. In Table V, it will be observed that the same city leads all others in its diarrhœal rate, 135.67, which surpasses the total infantile death-rate of Barmen (131.61) and of Cassel (127.11). Indeed, it is higher than the rate from all causes for England and Wales in 1903 (125), for Scotland in any one of fifty years, the highest record for that country being an average of 128 for the decade, 1891 to 1900; for Norway (average of twenty years, 1874 to 1893, 105; 1902, 75.5); for Sweden (average of twenty years, 1874 to 1893, 118; 1902, 107); Ireland (average of twenty years, 1874 to 1893, 96.6); and is almost as high as the total rate for France (1903, 137) and for all Danish cities in 1903 (137.6).

TABLE V.

Place.	Infantile death-rate.	Diarrhœal infantile death-rate.	Percentage of infant deaths due to diarrhœal diseases.
Aachen	195.12	78.60	40.28
Altona	169.12	38.37	22.69
Barmen	131.61	47.64	36.20
Berlin	199.83	87.99	44.03
Bochum	161.66	50.20	31.05
Bremen	173.59	73.92	42.92
Breslau	244.39	98.62	40.36
Brunswick	196.64	81.22	41.32
Cassel	127.11	31.85	25.06
Charlottenburg	154.75	54.35	35.12
Chemnitz	270.99	135.67	50.07
Cologne	212.45	93.60	44.06
Crefeld	141.71	53.42	37.69
Dantzig	243.19	109.87	45.18
Dortmund	184.96	61.75	33.38
Dresden	191.29	83.23	43.51
Duisburg	151.12	97.38	44.59
Düsseldorf	187.97	82.43	43.85
Elberfeld	148.90	50.97	34.23
Erfurt	201.69	42.90	21.27
Essen	157.78	66.67	42.26
Frankfort a. M.	154.67	53.13	34.30
Gelsenkirchen	156.89	58.11	37.04
Halle	235.71	124.77	52.94
Hamburg	172.83	70.98	41.07
Hannover	160.63	37.41	23.28

Karlsrühe	185.12	86.17	46.55
Kiel	177.65	72.99	41.08
Königsberg	233.25	113.47	48.65
Leipzig	222.14	121.49	54.69
Magdeburg	233.52	100.73	43.14
Mannheim	203.67	86.46	42.45
Munich	217.39	95.33	44.14
Nuremberg	247.53	113.80	45.97
Plauen	208.01	35.25	16.95
Posen	248.29	92.52	37.27
Rixdorf	218.49	103.66	47.44
Schöneberg	150.00	49.38	33.13
Stettin	260.54	112.28	43.09
Strasburg	190.45	92.82	48.74
Stuttgart	205.63	74.80	36.38
Wiesbaden	161.91	49.42	30.52
Average	198.16	80.34	24.03

It will be noted, further, that three of these German cities, Chemnitz, Halle, and Leipzig, all had a diarrhœal death-rate (135.67, 124.77, and 121.49) higher than the latest obtainable rates for all causes for the cities of Christiania (102), Lyons (110), Bordeaux (112), Amsterdam (116), Stockholm (118), Zurich (107), Geneva (117), and Basel (120).

An average diarrhœal rate of 80.34 for the forty-two leading German cities may well cause public authorities, not alone in Germany but everywhere, to stand aghast; and especially where no records are kept, to wonder what careful and systematic registration would reveal. In these forty-two cities we find that more than two-fifths of the infantile mortality is due to diarrhœal diseases, a considerably higher rate than obtains in France.

If we take the statistics of the same place for a series of years, we find that any considerable fluctuations in the rate from all causes are due chiefly to differences in the diarrhœal rate alone, the rate for all other causes varying comparatively little from year to year. This is shown, for example, in the case of Berlin, in the following table:

Table VI.

	Births.	Deaths.	Rate.	Diarrhœa.	Per cent.	Other causes.
1900	49,834	11,762	236.02	4.743	40.32	7,019
1901	50,453	11,325	224.46	4,783	42.14	6,542
1902	49,356	8,927	180.87	2,417	27.07	6,510
1903	47,802	9,452	197.73	3,199	33.84	6,253
1904	48,885	9,783	200.12	2,846	29.09	6,937

Taking the years with the highest and lowest percentage mortality from diarrhœa, 1901 and 1902, we note that while the difference in percentage is large (15.07), the number of deaths from all other causes is practically the same; and we note, further, that, whereas the difference between the highest and lowest number of diarrhœal deaths for the five years is 2366, the figures for deaths from all other causes have an extreme range of 766.

Let us return for a moment to the American and German returns set forth in Tables II and V.

The infantile death-rates of German cities of more than 100,000 population, during the twelve months ended June 30, 1906, which, as a rule show an improvement over those obtaining in 1904, include not one in excess of 300; our meagre returns show no fewer than nine, with one in excess of 400. The highest German rate is that of Chemnitz (270.99), which rate is surpassed by no fewer than fifteen of our registration cities and towns. Only two of the forty-two German cities in Table V show a rate higher than 250; Table II shows nineteen. Seventeen of the German cities show rates higher than 200; our returns show fifty-seven. It is true that, in making these comparisons, we are dealing not with populations of the same size, the German cities having populations in excess of 100,000 and ours being, in most cases, far smaller; but the home returns are the best available and suggest that with universal registration, our showing would be anything but satisfactory and commendable. And it would seem probable, too, that complete returns would show the same enormous influence of diarrhœal diseases and of artificial feeding that is shown in those countries which give these matters proper consideration and study.

III. SEASONAL DISTRIBUTION.

When we study the seasonal distribution of infantile mortality, we find enormous fluctuations, the summer months showing a sudden upward curve and the autumn months an equally sharp decline. Thus, in 1905, in the German cities and towns with populations exceeding 15,000, there were registered 628,060 births and 128,035 deaths under one year, a rate per thousand of 203.8. The deaths from diarrhœal diseases ranged, according to months, from 1192 in January to 15,863 in August, after which month there was a sharp fall.

The city which showed the highest percentage mortality from diarrhœal diseases was Leipzig. A study of its birth-rate, its infantile death-rate, and its diarrhœal infantile death-rate, by months, reveals the fact that, in August, the proportion of deaths to births was 570:1000, and of diarrhœal deaths to births, 430:1000, whereas in February the proportions were, respectively, 131:1000 and 37:1000.

The non-diarrhœal death-rates of a city is subject to no very wide fluctuations from month to month.

From the facts and figures thus shown it might be inferred that all infants under one year of age are in great danger during the hot summer months, but this is far from being the case. Not the three summer months, but the first three months of life are the dangerous period. The report of the Registrar-General of England and Wales for 1904 shows that 49 per cent. of the infantile mortality occurs during the first three months; 20 per cent. in the second three months, and 31 per cent. in the third and fourth three months of life. In Berlin, in 1904, of 9783 infant deaths, 3175 occurred in the first month of life; 1120 in the second, and 949 in the third; thus, 5244, or 53.6 per cent. occurred in the first three months. In 1903, of 9492 deaths, 5206 (or 55.08 per cent.) occurred in the same period. The percentage for the years 1900, 1901, and 1902 were respectively 53.21, 53.47, and 55.83. And yet, in Germany, in 1905, 41.37 per cent. of the infantile mortality occurred in the months of July, August, and September, and of the 52,966 deaths which then occurred, no less than 62.8 per cent. were due to diarrhœa. How then can this seasonal distribution and the age-periods be reconciled? The answer is by no means difficult. In the first place the cause of infantile mortality that stands second to diarrhœal diseases is set forth as congenital debility. It knows no season and its victims, whether born in January or August, die largely on their first day and in their first week or month. These deaths are naturally distributed fairly evenly throughout the year, and those from other non-diarrhœal causes which have seasonal fluctuations tend to balance one another and maintain a fairly even line. With the vast majority of the others the chances of life and death depend upon the method of feeding, and the older an infant is when hot weather comes on, the better its chance of life; for after eight or nine months of life the possibility of going through a hot summer unharmed, however fed, is vastly greater than that of the infant born in spring or summer and fed artificially.

IV. INFLUENCE OF METHOD OF FEEDING.

In 1903, the Prussian infantile death-rates ranged from 143.82 for Barmen to 357.18 for Dantzig. In 1904, Barmen was again the lowest with 139, and for the twelve months ended June 30, 1906, was surpassed in this respect only by Cassel, which city had made great improvement over its record for 1904, 127 against 163. The enviable position of Barmen in this particular is attributed by Kriege and Sentemann[1] chiefly to the high percentage of breastfeeding, namely, 63, with 15 per cent. partially breast-fed and 22 per cent. bottle-fed. In the city of Graz, in the years 1903 and 1904, there were, according to K. Helle,[1] 170 deaths of infants from diarrhœal disease. Of this number but 4 were breast-fed, 48 were partly breast-fed, 117 were wholly bottle-fed, and in one case the method was unknown.

In Australia the authorities are gravely concerned. According to Dr. A. J. Turner,[2] during the summer months, in Brisbane, more than half of the bottle-fed babies die; and Dr. Eleanor Bourne, of the Brisbane Children's Hospital, says that the majority of babies entered suffer "from the effects of improper feeding and nothing else." And Mr. P. E. Muskett, of Sidney, has asserted that of 303,070 infants dying in Australia and New Zealand in the course of 19 years prior to 1903, half might have been saved.

Dr. Arthur Newsholme,[3] M. O. H. for Brighton, England, asserts that breast-fed infants contribute but one-tenth of the diarrhœal infantile mortality, and Dr. W. J. Tyson,[4] states that three-fourths of the 150,000 infants dying annually in Great Britain from all causes are bottle-fed. Dr. G. F. McCleary,[5] M. O. H. for Hampstead, says that the infantile mortality dependent upon defective infant feeding is, broadly speaking, a mortality of hand-fed infants.

Dr. J. E. Sandilans,[6] inquiring into the method of feeding of 695 infants in the Borough of Finsbury during the first nine months of life, ascertained that of the 139 that died of diarrhœal diseases, but 16 per cent., and of those that survived, 69 per cent., were breast-fed.

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[1] Centralb. f. allg. Gesundheitspflege, 1906, xxv.
[1] Archiv. f. Hygiene, 1905, lvi. 18.
[2] Lancet, 1906, i., 1438.
[3] Journal of Hygiene, April, 1906.
[4] Journal of State Medicine, September, 1904.
[5] Lancet, Aug. 18, 1906.
[6] Journal of Hygiene, January, 1906.

In Munich, in 1903, of the 4075 infants that died, investigation showed that 3395 (or 83.3 per cent.) were artificially fed. Most striking and instructive of all, however, are the facts revealed by the very admirable statistical returns of the city of Berlin, and by the researches of Budin concerning the infantile mortality of Paris during 1898. From the former it appears that in Berlin during the five years 1900 to 1904 less than one-tenth of the infantile mortality occurred among those fed solely at the breast. The figures for each year are shown in Table VII.

Budin's research concerning the infantile mortality of Paris during 1898, shows not only the enormous preponderance of deaths among the artificially fed, but its seasonal and weekly distribution.

TABLE VII.

Year.	No. of deaths of infants whose method of feeding was ascertained.	Number breast-fed.	Percentage solely breast-fed.	All Others.
1900	9558	895	9.36	90.64
1901	9338	856	9.17	90.83
1902	7027	768	10.90	89.10
1903	7680	723	9.41	90.59
1904	7780	753	9.68	90.32

V. CLASS MORTALITY.

High infantile mortality is largely a class mortality, as is evident when one studies the returns of individual communities. It is highest, as a rule, in cities and towns whereof the population is largely ignorant and poor and where women are employed to a great extent in mills and other industrial establishments and help in this way to pay the family expenses. When pregnant, they work as long as possible up to the time of confinement, after which they return as soon as they can, leaving their offspring to the care of others and to be brought up on the bottle. In Massachusetts, for example, the cities with the highest infantile mortalities are "mill towns;" those with the lowest are chiefly residential in character and hold out no opportunities for the employment of married women, or their industries are of such a nature that the male wage-earners can properly maintain their wives at home as helpmeets in the true sense of the term. In other States and in foreign countries the same is commonly true;

but in some of the States with large negro populations, ignorance and poverty have an equal or greater influence.

At the National Conference on Infantile Mortality held in London in June, 1906, Dr. George Reid[1] contrasted the infantile mortality of two districts, identical in health conditions, but with the important difference that, in one, women are largely employed in industrial pursuits, whereas, in the other, where mining and ironworking are the principal industries, there is practically no employment for them. From figures obtained from the Registrar-General, he classified the artisan towns into three groups:

I. Those in which the proportion of employed married and widowed females between the ages of eighteen and fifty years reached or exceeded 12 per cent. of the total number of women of those ages; II, those in which the proportion was from 6 to 12 per cent.; and III, those in which it was below 6 per cent. In group I, the infantile mortality was highest and in group III, it was lowest; and this order was found to obtain constantly since 1881. Thus, in the decades 1881 to 1890, 1891 to 1900, and four-year period 1901 to 1904, the average yearly infantile mortality rates of group I, were 195, 212, and 193; of group II, 165, 175, and 156; and of group III, were 156, 168, and 149.

Further, to illustrate the fact that we are dealing with a class mortality may be instanced the observations of K. Helle,[2] concerning the station of 170 infants that died of diarrhœal diseases in Graz during 1903 and 1904. Not one belonged to a rich family, and but 9 to the well-to-do class; whereas, 49 were of the poor, and 112 of the very poor. Thus the percentage division among the four classes was respectively 0, 5.3, 28.8, and 65.9. Again, according to H. Neumann,[3] in Berlin, in 1903, of 2701 infantile deaths investigated, 1792 occurred in one-room dwellings, 754 in two-room, 122 in three-room, and 43 in larger dwellings.

Illegitimacy, where common, has doubtless a very great influence generally on infantile mortality, and yet in some foreign communities where foundlings are cared for in institutions the mortality of this unfortunate class is smaller than that of the legitimate.

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[1] Lancet, 1906, ii., 423.
[2] Archiv. f. Hygiene, 1906, lvi., p. 15.
[3] Deut. med. Woch., 1904, p. 1723.

VI. INSANITARY DAIRYING.

Returning now to the consideration of methods of feeding, the question arises as to why the artificially-fed show so much higher mortality figures than the breast-fed. In the first place, each mammalian species has its own natural food supply. The natural food of the infant is human breast-milk, which differs materially in character and composition from cows' milk, which is the principal substitute therefor. It differs chiefly in the character of its proteids and to a slight extent in the nature of its fat; but by means of the well-known method of modification, cows' milk can be converted into an acceptable substitute, provided it is of proper quality. Most unfortunately, however, cows' milk is almost universally far from being of proper quality when it reaches the home of the consumer in large cities and towns, and even in the rural districts where it is produced. Indeed, it is unfit for infants' use in the great majority of cases before it leaves the premises where it is drawn, for the conditions which obtain at dairies generally in all the countries of the world, with few exceptions, are such as to insure its immediate seeding with various species of harmful bacteria; that is to say, the great majority of dairies are dirty in appointments and methods.

In this country wherever public authorities and private associations have undertaken investigations of the conditions under which the public milk supply is raised, these have been found to be often of the most revolting character, and in a number of States and cities much is being done in the line of compelling improvement. Often the objectionable conditions are evenly distributed throughout the dairy: everything is dirty—the premises as a whole, the barn, the litter, the cows, the milkers, the utensils, the water supply, and every process from the cow to the can. Where everything is dirty, and carelessness in handling is the rule, it is hardly to be expected that the product will be clean and wholesome; and when to the original handicap are added the changes due to improper conditions during long transportation and storage, frequent handling, common methods of adulteration, and lack of care at the point of final delivery, it is not a subject for wonder that when it reaches the stomach of the infant it has acquired a more or less poisonous character.

In England the conditions of dairying are, if anything, far worse than in this country, owing largely to the extent to which local authorities are bound by official red tape. The milk of London, for example, comes largely from a distance and is subject to no control whatever by the metropolitan authorities; and even where it is produced the local authorities are equally without power. According to Dodd,[1] the steps necessary to stop the introduction into London of an infected milk supply include the obtaining of an order of inspection from a justice in the district where the farm is situated, inspection by a veterinary surgeon, report to the authority, service of notice on the farmer to appear and show cause why his milk should not be excluded from sale, and condemnation by the authority. But even then the dairyman may refuse to allow inspection on pain of summons and fine of not exceeding five pounds, and in the meantime may sell his diseased cows to another, whereupon, the process must begin again as before. Moreover, inasmuch as London comprises no fewer than 29 districts, in order to exclude an infected supply from every part of the metropolis, it would be necessary for the 29 medical officers to go to the place of production and obtain 29 separate orders of inspection, 29 reports, 29 orders of notice to show cause, etc. And despite the efforts of the London County Council, in 1902, to acquire authority to exclude infected milk from the whole county of London, the bill was killed in the House of Lords on account of the opposition of certain Borough Councils. The provincial sanitary authorities are equally powerless, for although under the Infectious Diseases Prevention Act of 1890 they can exclude infected milk, they must first give notice to the County Council concerned and to the Local Government Board and must withdraw the order when the Sanitary Authority or Medical Officer of Health is satisfied that the supply is changed or the source of infection is removed, perhaps to another county. Dodd says that these orders are, generally speaking, a dead letter in most rural districts, since the local authorities will not enforce them, because they are not for the benefit of their own but of distant populations.

In this country, happily, these things are better ordered in those States which have adequate health laws. In Massachusetts, for example, the local board of health of even the smallest town has power to exclude from its markets the milk of an infected or simply dirty dairy, whether that dairy be local or far distant, and without anything more than its own order.

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[1] The Problem of the Milk Supply, London, 1904.

One may obtain a fair idea of the conditions which obtain in English dairies by reference to reports and papers presented by various health officers and other writers. Dr. Groves[1] says: "The conditions under which milk is collected in this country, especially by small diarymen, are simply too awful." Hime,[2] describing conditions as he found them at the farms which supplied Bradford with milk, states that he saw children's napkins washed in milk-cans, and "once I saw articles even yet more foul being washed in a milk-can which was to be used an hour later for dairy purposes." The dairies of Staffordshire appear to be far from deserving commendation. Dr. George Newman[3] quotes the medical officer of Stoke-on-Trent, who stated in his report for 1900 that nearly every cow-shed inspected was overcrowded, badly lighted, and even not lighted at all, unventilated and with air so foul as to repel a visitor, dirty as to walls and floor, undrained, and containing filthy cows and accumulations of manure. Dr. Reid, M. O. H. for Staffordshire, wrote Newman in June, 1903: "I may mention generally that I very rarely come across a dairy farm which is satisfactory as regards the cow-sheds; most are ill-lighted, overcrowded, badly ventilated, and badly drained."

The report on the health of Manchester, for 1902, quoted by Dodd, says that the great majority of the farms of Cheshire, Derbyshire, and Staffordshire are unfit for dairying and that the cows and sheds are very dirty and many of the cows are tuberculous. Newman[1] says that in 1901, 9.2 per cent. of the cows supplying Manchester from outside the city were tuberculous, and, in 1902, 8.4 per cent. The great majority of farms visited were in a very dirty condition, and totally unfit for the production of milk. The veterinary surgeon reported that the Cheshire farms were distinctly bad, but that the farms in Derbyshire and Staffordshire were decidedly worse. Dr. G. F. McCleary,[2] M. O. H. for Battersea, says: "Cows' milk, as usually supplied in this country, may be, and often is, a source of grave danger. It is often grossly contaminated, the contamination taking place at the farm, in transit, in the milkshop, on the milk-round, and last, but certainly not least, in the home of the consumer."

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[1] Journal of the Sanitary Institute, May, 1905, p. 229.
[2] British Medical Journal, 1903, ii., 1669.
[3] Public Health, February, 1904, p. 258.
[1] Loc. cit.
[2] Journal of the Sanitary Institute, May, 1905, p. 225.

Cumulative evidence concerning the unfitness of English dairies might be quoted almost indefinitely, did space permit, and were it necessary. The conditions obtaining in Ireland are said to be even worse. Thus, Bulstrode and Tunnicliffe[3] have made a very unfavorable report, in which the filthy state of the Dublin dairies comes in for special mention.

In France and Germany, the dairy conditions rank in the main with those of England. The lack of control of French dairies is the chief impelling influence in the establishment of the numerous milk-depots and the furnishing of pasteurized milk to the poor. In Germany, the great majority of dairies are dirty and badly managed, and although many of the cities have established regulations, few enforce them.

According to A. Reinsch,[4] in ninety-five cities with populations in excess of 40,000, eighty-one have milk regulations more or less in agreement, but concerning the presence of dirt these vary widely. Some require that there shall be no visible sediment on standing two hours, others that the amount shall not exceed 15 milligrams per liter; but in sixty-one no attention is paid to the amount of dirt which may be present.

Perhaps the worst conditions as to milk supply are those which obtain in India. According to an article in the *Lancet,*[5] a committee of the Corporation of Calcutta, in a report on the milk supply of that city, stated that in a majority of cases "the cattle were in a filthy condition and were standing in offensive smelling filth inches deep; their udders were covered with muck; the cattle were packed together so closely that there was no room for them to lie down; the sheds were painfully ill-ventilated, the entrances being blocked by platforms on which the cow-men slept, and all the air-holes being closed up with mud bricks," and Mr. D. R. Bardi[1] asserts that in Bombay, where milk is extensively adulterated with polluted water, the infantile death-rate reaches the enormous height of 786.5.

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[3] Parliamentary Paper. (Cd. 833), Appendix IV.

[4] Die gesetzliche Regelung des Milchverkehrs in Deutschland, Hamburg, 1904.

[5] Nov. 18, 1905, p. 1512.

[1] Transactions of the Bombay Medical and Physical Society, Vol. ix., No. 1, quoted by the Lancet, 1905, ii., 1853.

In the Scandinavian countries, whose infantile death-rates are conspicuously low, even during the hotter months, far more attention is paid to dairy cleanliness and methods than anywhere else in the world, and yet with all their care there is room for much improvement, as one can learn from personal observation at first-class dairy farms and milk-distributing concerns in Denmark.

It may be asked: If infantile diarrhœas are due to mlik produced, handled, or stored under improper conditions, why is it that they are so vastly more prevalent in July and August, when, at least, the cows at pasture are more likely to be clean than when housed? Milk produced under ordinary conditions is sure to contain large numbers of bacteria per cubic centimeter before the operation of milking is completed; under favoring conditions these organisms multiply enormously within a few hours; and the one favoring condition of growth is warmth. If milk is cooled at once to 45 deg. F. and kept at about that temperature until needed for use, the original bacteria not only may not have increased materially, but may even have diminished in numbers; but at how many dairies in every hundred is milk properly cooled and to what extent is milk kept cool during long-haul transportation, retail delivery, and home storage? How many small dairymen can afford to use ice when their product yields them so small a margin of profit? How many would use it in any event unless compelled to?

Milk "cooling" in cans immersed in a tub or trough containing water, unchanged, perhaps, for days at a time, and exposed to the rays of the broiling August sun, is a common sight in the country. After collection and delivery at the railroad station, the cans may stand a long time on the platform in the sun, and then may make a long trip in a car not provided with ice. Next comes the handling by the retailer, and perhaps another period of storage in a stable; then delivery of small cans and jars, left on the customer's doorsteps; and lastly, the storage in the home, perhaps without ice—for it must be remembered that cholera infantum is largely a disease of the poor—with exposure to dust and dirt and flies. Under these very common conditions, it is then not strange that a city's milk supply is so often richer in bacteria than its sewage.

Far less infantile diarrhœa occurs in the country than in cities and large towns, in proportion to population, because the milk used in the country is at least comparatively fresh, while that used in the towns is in large part decidedly stale and unfit for drinking. It is hard to convince the dairyman of less than average intelligence that dirt in milk breeds disease. He will tell you that he was brought up on it, as was the entire neighborhood; he points out the living adults and children, forgetting the infant dead; he cannot believe that a mere trace of visible cow-manure can do any harm or that bacteria which are so small that billions of them may be suspended in a teaspoonful of milk, can be large enough to accomplish any results; and he thinks clean milk a fad and complains, with right, as a rule, of the meagre reward of his labors. He has, most likely, no nearby source of ice supply; he cannot buy ice out of his small profits—quite likely he would not buy it any way; and his method of cooling is, in his opinion, quite good enough. And thus it happens that the unequal seasonal distribution of infantile diarrhœa is largely a consequence of inadequate cooling and storage of milk.

VII. POISONOUS AND INFECTED MILK.

Concerning the ways in which milk becomes seeded with bacteria as its place of origin, it is hardly necessary to enlarge, for they are now too well-known to the profession and the intelligent laity; but there are certain points about dirty milk which are not yet generally understood. Not all the bacteria that gain access to milk at the farm are capable of causing injury to the consumer; in fact the great majority of the more than 200 varieties isolated produce no harmful effects. Many species shorten the commercial life of milk by causing souring and coagulation, and these have been likened by Professor Vaughan to the red lanterns used as danger signals on highways. While certain other more hardy forms are secreting or excreting toxic substances, and others of pathogenic nature are multiplying from hundreds to millions and tens of millions, the souring bacteria are manufacturing lactic acid from the milk sugar and bringing about changes in taste and consistence which render the milk nonpotable. They are easily destroyed at pasteurizing temperatures which do not affect the growth and activity of the various spore-bearing species, which peptonize and produce toxins; and so in their absence the latter can continue producing changes in milk, which grows more and more stale, and more and more dangerous, without becoming sour; and so long as milk remains sweet, so long is it considered by the world in general as fit for household use.

There is still another group of bacteria commonly present, of vastly more importance than the peptonizing species, namely, the pyogenic species which are associated with that most common of all bovine diseases, garget, or mammitis, and with other similar pathological conditions, as "yellow galt." The most common and most virulent of these is the streptococcus, which finds in warm milk a most favorable culture medium for rapid multiplication. Thus, Petruschky has shown that at room temperature (68 deg. F.) a streptococcal content of 300 per cubic centimeter may increase in twenty-four hours to one of 10,000,000; but the same milk kept at 50 deg. F. yielded but 30,000 per cubic centimeter, or but three one-thousandths as many. Escherich and others have noted the same rapidity of multiplication. Conn states that in fresh milk the majority of bacteria are streptococci, which come from the udder, and others have shown that these organisms may be present in the ducts, even when there is no actual inflammatory process going on. Thus, Uhlmann[1] studied more than 800 sections of 35 teats of cows, goats, and sheep and found bacteria, with micrococci predominating, in every section, and most numerous in the teats from cows. Bergey[2] studied the milk of several cows during an entire period of lactation and concluded that once an udder becomes infected with pyogenic bacteria the infection tends to persist over several periods of lactation. In another investigation in which a large number of milk samples, drawn in sterile tubes, were examined, Bergey[3] found that more than two-thirds contained bacteria, the prevailing forms of which were the pyogenic organisms, more particularly streptococci. Careful study of these organisms revealed no definite difference between them and the streptococci concerned in pathological processes in man. They were found in nearly all the samples which contained pus and in some from cows in which no inflammatory process could be discovered.

Garget being the commonest of bovine diseases, often existing without marked symptoms and only discovered by accident; and the milk of cows with no inflammatory process going on, but with infected milk ducts, often containing pyogenic organisms, one would infer that a large part of the public supply ought to yield considerable numbers of streptococci on bacteriological examination; and the inference would be correct. Bergey[4] found them in half the samples examined from the Philadelphia supply. Rabinowitch found them in abundance in samples from Berlin, even from the model dairies. Kaiser[5] examined 30 samples from Graz and found that all but 7 contained streptococci, either alone or associated with staphylococci and other organisms; that is to say, 76.7 per cent. were infected; and the number of streptococci present ranged from 100,000 to 100,000,000 per cubic centimeter. Eastes[6] examined 186 samples of London milk and found streptococci in about the same proportion—75.2 per cent. Foulerton[1] found staphylococci in 28 per cent. and streptococci in 32 per cent. of samples of the supply of Finsbury. The worst showing is that made by Leipzig samples in the hands of Brüning;[2] and be it remembered that in Table V the city showing the highest percentage of infantile deaths due to diarrhœal diseases is Leipzig. Brüning found streptococci in numbers ranging from 100 to 1,000,000 per cubic centimeter in 26 of 28 samples (93 per cent.).

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[1] Inaugural Thesis, Jena, 1903.

[2] University of Pennsylvania Medical Bulletin, July-August, 1904.

[3] Pennsylvania State Department of Agriculture, Bulletin 125, 1904.

The pyogenic bacteria are by no means the sole exciting causes of infantile diarrhœas, although they appear to be very largely responsible. In addition to these and the peptonizing species are the several types of the dysentery bacillus, Proteus vulgaris, Bacillus pyocyaneus, and others. Nor are the summer diarrhœas the only disturbances caused by streptococci and other bacteria; but these concern children of larger growth and adults.

VIII. THE REMEDY.

What is the cure for the annual waste of human life due to stale and infected market milk? The most obvious answer would be the discontinuance of cows' milk in feeding infants, but unfortunately, bad as it is, it is the only available substitute or basis for a substitute for human milk. Then why not encourage breast-feeding? It is an unfortunate fact that a very large proportion of mothers cannot, if they would, suckle their offspring, owing to their own physical defects, which are largely hereditary. Von Bunge's statistics, drawn from all parts of Europe, show that women unable to nurse are commonly daughters of alcoholics, and he states that if two generations have been alcoholic, the third will almost certainly be unable to suckle their children. The proportion of mothers defective in this respect is commonly stated to be about half, but Bunge asserts it to be not more than a quarter.

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[4] American Medicine, April 20, 1901.
[5] Archiv. f. Hygiene, 1906, lvi., 51.
[6] British Medical Journal, 1899, ii., 1342.
[1] Brit. Med. Jour. 1904, ii., 424.
[2] Jahrbuch f. Kinderheilkunde, 1905, lxii., No. 1.

In the lower strata of society, breast-feeding is to a large extent interfered with by the economical and sociological conditions which compel married women to work in industrial establishments, and in the upper strata it is neglected on account of its interference with what are miscalled social duties. The employment of married women may or may not be necessary, but the observation of the Rt. Hon. John Burns, President of the Local Government Board, at a national conference on infantile mortality, held in June, 1906, that it tends to make loafers of the husbands and hoodlums of the children, who lose the restraining influence of a mother's constant care, is doubtless true. He asserts that infantile mortality often rises with full employment and high wages, because of greater opportunities for obtaining alcoholic drink, and falls with poor trade. "Married women's labor makes loafers, is an individual injury, a social mistake, and a commercial blunder."

In France and Italy, the advantages of breast-feeding receive governmental and commercial recognition. In France, it is a common practice in factories to post placards proclaiming the advantages of breast-feeding and offering every facility to women to nurse their infants, including special rooms, and the women are allowed leave of absence at intervals for this purpose. In Italy such a room is obligatory in every establishment employing more than fifty women. In Vienna, an association of physicians and others has been formed to encourage suckling and to instruct mothers concerning the relation of methods of feeding to infantile mortality.

It has been observed that infant mortality among the Jews is comparatively low, and the reason therefor is doubtless the fact that among that race it is regarded as disgraceful for a man to allow his wife to work in a factory and deprive her children before their birth and afterward of a mother's care.

In view of the inability plus uncompromising disinclination of a large proportion of mothers to nurse their infants, it becomes necessary to choose the best available substitute, which happens to be cows' milk. Now, cows' milk, as we have learned, is, generally speaking, a dirty substance, unsuited hygienically or esthetically to use as a human food. Fortunately, its pathogenic power can be removed or very greatly impaired by heating, for it appears on the evidence to be true that the toxic substances of stale milk are destroyed like the pathogenic organisms of infected milk in the process of pasteurization. But is pasteurization the remedy? Is it not better to start with a clean supply than to sterilize the pus and dung just before consumption? Besides, the ignorant poor will not pasteurize milk with any regularity or great care, and too much reliance should not be placed upon municipal milk stations and philanthropic distribution.

Space will not permit, nor is it necessary to enter upon, a discussion of the injurious influence of pasteurization upon the natural properties of unheated milk; nor can the question of milk stations and "gouttes de lait" be considered here, however valuable we recognize these institutions to be; and this paper will close with a plea for clean milk at the farm and proper methods of transportation, storage, and delivery.

Who is to blame for dirty milk? Those unfamiliar with the conditions will answer that it is the farmer. While it is true that the original seeding, either with the pus and streptococci of garget or with the hundreds of varieties of bacteria incidental to dusty and dirty cow-barns, cow-dung, dirty clothes, dirty hands, dirty cows, dirty utensils, and dirty methods, takes place at the farm, the real responsibility lies with the consumer and the middleman. The consumer is disinclined to pay a fair price for this valuable article of food. Everything else may advance in price—meats, coal, sugar, gasolene, wages, oats, pearls, and theatre tickets—and the advance is met with at most some futile grumbling; but whenever a rumor goes out that milk is to cost an extra cent per quart, loud outcries are heard and always, ostensibly, on behalf of the poor. We do not see the authors of these outcries moved to pity for the poor on account of advances in the cost of flour and potatoes or in rent; the motif is milk. Now it happens that the poor are not large consumers of milk outside of the amount necessary for infant feeding, and that the small additional burden of perhaps a cent a day could go on for a long time before the whole would amount to the cost of the smallest casket or the services of the most considerate undertaker. But it is not consideration for the poor; it is an ingrained opposition to pay more for milk than was paid a quarter of a century ago. The general population regards the pure clean milk problem as a fad of theorists and of gentlemen farmers who keep cows instead of yachts. It does not know the importance of clean milk, and unfortunately is, in large part, able to point to the fact that for a month, or a year, or a boyhood it lived on a farm and milked a cow and knows all about it. The public needs proper education that clean milk is a necessity and that infant sickness and funerals can be reduced at least 40 per cent. at almost no cost in comparison. As to the middleman, it may be said that his share in promoting infantile mortality is as great as, but no greater than, that of the customer. He is to some extent a necessary evil, but he has been eliminated in some places and can be in others. Naturally, he wants as much profit as he can get; he would like to raise his price; he would like to pay the producer less. The producer must bear the burden of increased cost of grain and hay; it is for him to provide the ice, for him to provide the labor involved in maintaining general cleanliness and proper methods. Everything is put upon the producer, and unless his herd is large and his farm extensive and otherwise profitable, he cannot bear it and produce clean milk. Direct delivery to the properly enlightened customer would make the clean milk problem simple for the small producer; and so would co-operative handling, so much in vogue in the relatively most important dairying country in the world—Denmark where the incorrigibly or deliberately dirty producer cannot dispose of his supply.

The general elimination of the middleman is, of course, not a possibility, especially in the case of large cities which are supplied from areas a hundred or hundreds of miles away. But associations satisfied with a reasonable profit, like the two large companies at Copenhagen, for example, can handle the matter with justice to all concerned. The customer must pay a fair price, the producer must receive one, and the distributing centre should make a reasonable return on its capital. If the milk of a farm where filth is the rule, where the cows are not free from garget and other diseases and are not regularly inspected by a competent veterinarian; where ice is not used in cooling; where dairying methods are faulty, and other objectionable conditions obtain; if the milk from such a place is declined, that of the clean dairy is not handicapped by an unfair competition.

It is said that model farms exist for the well-to-do, without whose patronage they would invariably fail; that they cannot be made to yield a profit in competition with ordinary farms. A model farm properly manned certainly cannot compete on equal terms with a filthy farm, where no attempt is made to conduct the business in a decent manner, especially if the customers are indifferent. The dirty producer can even afford to cut prices and take customers away from the other, if customers care to save a cent and make it up in pus and cow-dung. But one does not need to run a model farm in order to have clean milk. Concrete floors and walls and monitortop barns are not absolutely essential, however satisfactory, in the production of clean milk. A clean man can keep a few healthy cows clean in a clean barn and use clean utensils and decent methods and make clean milk without increased cost, except in summer for ice; but with large herds the employment of others becomes necessary, and perhaps one or more men must give their whole time to keeping the cows, the premises, and the utensils clean. The dirty dairyman dispenses with these and thus has an unfair advantage in competition. If the product of dirty farms, large and small, were refused a market, model farms and small, clean, ordinary farms could thrive on equal terms. A large model dairy farm with an enlightened clientèle can be profitably operated even in competition with unclean farms; and this is done in many places. But they supply but small fractions of the populations in which they operate; and what is needed are clean farms everywhere, supplying profitably entire populations educated to refuse dirty milk at any price.

RUPTURED GASTRIC ULCER IN A BOY AGED TWELVE YEARS.

By G. Keppie Paterson, M.B., F.R.C.P.Ed.

The patient was a boy, aged twelve years eight months. I had attended him all his life and he had not suffered from any special ailment except recurring laryngeal catarrh. His gastric illness began with pain, indefinitely located about the epigastric region, occuring irregularly as regards the time after food; sometimes it was half an hour or two hours, or immediately after; at times there was no pain after a meal. The pain was of a burning character; he had no gastric flatulence nor vomiting. The tongue was very slightly furred. I put him on light diet and dyspeptic remedies, but these did not help him much. These symptoms continued twelve days, when about 7 P.M., after a light dinner, he suddenly felt a very severe pain in the abdomen. I saw him an hour after and found him collapsed, pale, with slow pulse and rigid abdomen; there was no loss of liver dulness and the temperature was normal. He complained much of pain in the abdomen about the umbilicus, and almost more of pain in the left shoulder, the latter aggravated with each inspiration. The abdominal pain was relieved with a fomentation and gentle friction, and all symptoms of shock had passed off within half an hour. It looked like a case of severe colic in a child, but the shock and previous pain made me doubtful, and I left instructions to be sent for later on if he became worse. I did not see him till nine next morning. He had vomited for the first time at 9 P.M., and again once through the night, but there had been frequent retching. The pain in the abdomen had become easier during the night. There were all the signs of peritonitis present, distended abdomen, temperature raised, and loss of liver dulness in front. There was a peritoneal burst, and Mr. Caird operated at 1 P.M., eighteen hours after the rupture.

On opening the abdomen, general peritonitis was found to be present, with a mass of lymph over the liver and stomach; when this was separated off, a punched-out ulcer about the size of a small split pea was detected on the anterior wall, about 2 inches from the middle of the lesser curvature. Two smears of the peritoneal fluid were taken, and afterwards one was found to be negative, the other showed a culture of staphylococci. The peritoneum was washed out and the lymph swabbed off the surface of the liver and from the pouch of Douglas. A drain was inserted in the wound and another above the pubes leading to the pouch of Douglas. He was given nutrient enemata for three days, then fed for two days partly by enemata and partly by the mouth; on the sixth day the enemata were discontinued. After the operation, and during the subsequent lung complication, his digestion was good, and he was able to take a considerable quantity of nourishment; it was only during convalescence he showed signs of gastric catarrh. On the third morning after the operation he had a dusky hue, and his temperature was subnormal; at 10 P.M. I found a patch of dulness with tubular breathing at the right base posteriorly. His temperature two hours before this was 98.6 deg., and at midnight it had risen to 100 deg. The dulness spread rapidly till two-thirds of the lung became involved. On the seventh day after the operation he showed signs of cyanosis and I began oxygen inhalation. His cough caused him much distress, but I was never able to get any mucus for bacteriological examination, as the sputum was small in amount and he had not the strength to expectorate it. Coughing was also sometimes attended with laryngeal spasm, as at the onset of his illness he had one of his laryngitis attacks. On the eighth day the base of the left lung became consolidated and rapidly extending involved one-third of it. His condition was now very serious. His temperature, at first irregular, began to show a morning remission, falling to normal in early morning, but rising in the forenoon and afternoon, the rising causing great distress. This morning remission did much to relieve the strain on his strength. On the ninth day after the operation, during the afternoon rise, his condition became very dangerous. His respirations varied up to about sixty a minute, the pulse was racing, at one time pulseless with marked cyanosis even though he was inhaling some oxygen; the slightest cough produced suffocative attacks with extreme dilatation of the pupils just as one meets in chloroform syncope, and there were spells of unconsciousness. Dr. Affleck saw him at the time, and to all appearance he was dying. Mr. Caird was hopeless. His parents were informed of his expected decease. Still we persevered. The oxygen funnel was held constantly close to his chin and mouth, and the oxygen given as fast as it would pass through the wash bottle; hypodermic injections of strychnine were repeatedly given. The spasm of the larynx was averted by applying hot sponges to the larynx as required. The temperature fell towards midnight and his condition was much relieved. Next morning, owing to the character of the temperature, the right pleura was explored with a syringe to ascertain if there was any empyema, but no pus was found. The afternoon brought a return of the distress and anxiety, but the symptoms were not so severe. On the following four days, though always suffering from the rise of temperature, he gradually improved, and on the fifteenth day after the operation his temperature remained normal all day. His convalescence was very slow, the right lung taking a month to clear up. He is now well and strong. He had different medicines during the illness, but the very free inhalation of oxygen seemed to be the main agent in his recovery.

The cause of his illness is obscure. He had never suffered from any gastric trouble, was especially fond of broth and vegetables, and he ate slowly, masticating his food well. Previous to the onset there had not been any indiscretion in diet, and he had no knowledge of swallowing any fish bone or anything likely to injure the mucous membrane. There was slight caries of one incisor tooth, all others were in perfect condition,—a very slight source of possible oral sepsis.

Gastric ulcer in children is a rare condition, though many cases have been recorded. Several fatal cases of hæmatemesis and of intestinal hæmorrhage, due to this cause, have been reported occurring in infants between the ages of thirty hours and fifteen days. Ulcers of the stomach have been found post-mortem at all ages in children, in an acute and chronic condition, with and without adhesions to the neighboring organs; single simple ulcers, also multiple; by themselves or accompanying general tuberculosis and typhoid. The largest number of cases is contained in a paper by Stowell in the *New York Medical Record* of 8th July 1905. Ruptured gastric ulcer is very rare, and I have prepared an abstract of all the reported cases in children under fourteen years of age that I have been able to discover. I found fourteen cases recognised post-mortem, and only one during life besides this case. They have been arranged according to age.

Grainger Bisset (1), an infant, m., died 45 hours old, after severe intestinal hæmorrhage. Post-mortem a ruptured punched-out ulcer was found on the posterior wall of stomach, over the lesser curvature, about half inch from the cardiac opening.

Cade (2), infant, two months old, suffered from diarrhœa and vomiting. Post-mortem a single perforating ulcer was found on the posterior wall opening into a cavity bounded by the pancreas, meso-colon, and transverse colon.

Northrup (3), f., one year old, suffering for a month from vomiting and diarrhœa. Stomach covered with small follicular ulcers, and a large one that had perforated.

Colgan (4), f., two and a half years, died of convulsions with pyrexia; ruptured ulcer on the posterior wall near the lower border of the fundus.

Porter Parkinson (5), m., two years two months, gastric symptoms, with fever, for ten days, then hæmatemesis and acute peritonitis. Ulcer with a perforation of the size of a pin's head near the centre of the posterior wall of the stomach.

Bechtold (6), 1904, f., aged five and a half years, ill five months; a sudden illness diagnosed as peritonitis due to appendicitis. An incision over the appendix liberated pus, but appendix was not diseased. Post-mortem a perforated ulcer was found in the greater curvature.

Reichelt (7), m., eight years; suffered from pains in the stomach. Perforation found 1 c.m. above the pylorus in the lesser curvature.

Stowell (8), f., eight years, always delicate, recent gastric trouble with vomiting. Two perforated ulcers were found on the posterior wall about two inches from the pylorus.

Buzzard (9), f., nine years; discomfort after food for a short time, sudden perforation and death. Rupture of ulcer in the lesser curvature of the stomach, midway between pyloric and œsophageal openings.

Barker (10), m., ten years; three or four days ill, collapsed and died in two hours. Four ulcers in stomach, two of which had perforated.

Leith (11), f., ten years; left pneumonia, followed by left empyema. Post-mortem, ulcer of stomach had perforated the diaphragm.

Gröss (12), f., twelve years, had acute tuberculosis. Two small and one large ulcer in stomach; this large one had perforated into the omentum, evidently shortly before death.

Rufz (13), f., thirteen years; dyspepsia for some months. Perforation of an ulcer, two inches broad, in the lesser curvature.

Barthaz and Sanné (14), f., thirteen years, had dyspeptic symptoms and vomiting. Death very rapidly after perforation from an ulcer on lesser curvature of stomach.

These were all discovered post-mortem. The following is the record of the only other case beside my own that was discovered during life.

Cheyne and Wilbe (15), m., thirteen years; had some stomach-ache one day, which passed off with a hot-water bottle. Next day, after early dinner, he had severe pain in the abdomen and became very ill in the afternoon. He was seen by Mr. Watson Cheyne in the evening, who was of opinion that it was a case of perforation of an abdominal organ, probably fulminating appendicitis. The operation for appendicitis was begun, gas escaped from the abdomen, and some whitish fluid. The appendix was found to be thickened, reddened, and contained a large concretion. It was removed, but no perforation was found in it or in the cæcum. As there were no fæces in the abdominal cavity, another incision was made over the stomach, and after careful search a ruptured ulcer was with difficulty discovered high up on the anterior surface about one inch from the cardiac end. He recovered without complication.

A case is reported in the *British Medical Journal* of October 28, 1899, of a girl, aged nine years, who had been operated on for ruptured gastric ulcer; Dr. A. R. Parsons informs me it is a misprint for 19. It is unfortunate, as the case is erroneously repeated in different statistics and papers.

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INTUSSUSCEPTION IN INFANTS.[1]

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The interest in acute intussusception, or invagination, lies in the fact that, while it is the commonest form of acute intestinal obstruction in infants, it is comparatively rare in later childhood and adolescence, and in adult life it is exceedingly uncommon. The importance of the affection is evidenced by the knowledge that prompt diagnosis and treatment usually lead to a successful issue, whereas delay of even a few hours may mean that the invaginated bowel becomes irreducible, and a fatal issue certain.

The disease usually occurs in healthy strong fat babies, under one year, of whom a large majority have been entirely breast-fed, and in whom there is only exceptionally any evidence of improper feeding, gastro-enteritis, or wasting, which are stated by some authors to be the predisposing causes of the condition—an opinion which many recent observations conclusively prove to be incorrect.

I can suggest very little as to causation, for any explanation, which can satisfy searching scrutiny, must conclusively show why it is so common in babies and yet rare in adults. The above postulate at once suggests some anatomical condition which is present in infancy, but which gradually disappears towards adolescence, and when, in conjunction with this, we remember that the ileo-cæcal region is the commonest situation of intussusception, and that here the small bowel, with a long freely movable mesentery, is giving place to a more fixed large intestine with wider lumen, we have an anatomical fact which may be one factor in the production of an intussusception. Further, I have often thought that the relatively greater freedom of the ileum and cæcum in infants, and even of the lower part of the ascending colon, where the embryonic mesentery is often incompletely transformed into the adult or normal condition, may help to explain the age incidence of this disease.

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[1] Read before the Beckenham Medical Society.

For the fact that it is about twice as common in male as in female children I can offer no explanation.

These remarks are founded on operations on nineteen infants with acute intussusceptions under one year, and I have purposely excluded all my cases in older children or adults and also those suffering from chronic intussusceptions. In considering their symptoms, I would lay stress on the sudden onset of abdominal pain, evidenced in a previously healthy baby, by screaming, refusal of food, and drawing up of the legs; vomiting may take place once, but its repetition, until the late stages of obstruction are reached, is, in my experience, exceptional. When obstruction is complete, vomiting recurs, and has all the characters of other forms of acute intestinal obstruction, then also constipation is complete. Blood may be passed in the initial paroxysm, but it is more common for from five to ten hours to elapse before the typical blood and slime are passed, and, during this time, one or more normal motions may be evacuated, or the bowels may be somewhat relaxed. None of my cases showed diarrhœa before operation, and in fact the time interval, before blood is passed, is just what would be expected, for the bleeding can only indicate exudation from an engorged mucosa, a condition which does not immediately follow upon the onset of symptoms. Fortunately for the patients, the above symptoms are usually alarming enough to necessitate examination by a medical man, when an abdominal tumour is sought for.

After a few hours of intussusception, the aspect of the baby is characteristically "abdominal"; the ringed sunken eyes and the greyness round the mouth forcibly demonstrating that the child is ill, and is, as babies so quickly do, showing evidence of suffering from want of fluid in its tissues. The pulse is usually rapid and the temperature subnormal. On examining the abdomen, there is usually tenderness, more marked on the right side, and abdominal rigidity exaggerated over the right rectus, which may be so troublesome as to necessitate an anæsthetic before anything further can be made out. The tumour is of very variable size and shape, and, only rarely, is the typical sausage-shape tumour detected. In my experience, it is rather commoner on the right than the left side of the abdomen, while, in a fair proportion of cases, the tumour is umbilical in situation. Its position is some guide as to its extent, for an intussusception tumour, beginning in the ileo-cæcal region, passes through the right lumbar region to the right hypochondrium, and so by the umbilical to the left lumbar region where it is finally lost in the pelvis. I cannot trace any connection between this position and the duration of the trouble, although, naturally, those tumours, which have passed to the left side of the abdomen, are less easily reducible than those on the right.

In all but two of my cases a tumour was felt. These two were patients of 9 and 15 years of age, and do not properly come within the limits of this paper; both ended fatally. In two cases, the apex of the tumour entered the anal canal, and was there easily palpable on rectal examination. I cannot too strongly insist on this method of examination, combined with palpation of the abdomen by the left hand (the bimanual method recommended by Mr. Eve [*Clin. Journal,* 1899]).

By this, in a small child, one can easily explore the whole pelvis and much of the right and left iliac regions, and may not only feel an otherwise unnoticed tumour, but can also detect the absence of the cæcum from the right iliac region, which, in my opinion, is strongly suggestive of its presence, as a tumour, in another part of the abdomen. Treves says this (the Signe de Dance) is comparatively rare, but I must say I attach much value to it, and, as I always make a routine examination for it, find I can usually demonstrate this physical sign to those present. The most difficult cases, in which to feel the tumour, are those in which it is extensive, and in which, having passed into the pelvic colon, the intussuscepted bowel is coiled round the base of the mesentery, and is hidden behind the often distended small intestines.

The value of an anæsthetic, as an aid to diagnosis, cannot be over-estimated. It is my custom, at the Evelina and Guy's, when called upon to deal with a baby presenting symptoms suggestive of intussusception, to have the skin of the abdominal wall purified and compressed, and then to examine it thoroughly under an anæsthetic, when an operation is promptly undertaken should the tumour be discovered.

On one occasion, I opened the abdomen after feeling a small tumour which I suspected was not an intussusception, and which turned out to be large mesenteric glands, with fortunately no ill-result to the patient, and I have heard of a similar confusion with a wandering spleen and a dependent lobe of the liver.

If the above precautions and methods of examination are carried out, no intussusception should escape detection, yet I have heard of one case in which an unsuspected intussusception was first discovered at the autopsy. The differential diagnosis is, on the whole, easy; the chief difficulty is the diagnosis from gastro-enteritis, the ordinary diarrhœa and vomiting of infants in crowded neighborhoods. Perhaps the following points may briefly draw attention to what I think are the chief differential symptoms:—

1. The type of child; in gastro-enteritis, thin, flabby, wasted, and whining.

2. The sudden onset with acute pain, the amount of blood in the stools, and the abdominal tumour.

With the older children, in whom intussusception may be more chronic with acute exacerbations, the chief difficulty is in the diagnosis from tuberculous peritonitis with enlarged glands, or matted omentum, as in a case of a girl, æt. 9, in whom I resected the end of the ileum, cæcum, and the ascending colon, in the last stage of obstruction from intussusception, for which she has been under treatment for three weeks as suffering from tuberculous peritonitis.

Much has been written about the varities of intussusception, really without much clinical interest, and I should not introduce the subject here except that it has bearing on one practical point, as we shall see when we come to the subject of treatment. Of my nineteen cases, rather more than half were of the ileo-cæcal type, which is usually regarded as the common variety (Treves, 44 per cent.), though recently, in an exhaustive article in the *Annals of Surgery,* Corner has attempted to show that this percentage is excessive.

The other cases are mostly double intussusceptions, that is, the invagination begins in the last few inches of the ileum, as an enteric intussusception, and, reaching the ileo-cæcal valve either passes through it, or pushes the valve before it. One of my cases was enteric, and at least four began by an invagination of the caput cæci, and then ascended into the colon, drawing the ileo-cæcal valve and ileum with it.

Duration before Operation.—Of my cases that recovered the limits of duration were 5 hours to 45 hours; the two irreducible cases had existed 53 and 96 hours respectively. Gibson (*Annals of Surgery,* 1900) demonstrates, by statistics, that, after 48 hours' duration, the ease of reducibility rapidly diminishes, for he says that on the first day 94 per cent., and on the second 83 per cent., are reducible, but on the third only 61 per cent. may be so relieved.

Treatment.—While ready to admit that recovery has followed inflation with air, or injection of fluid through the rectum, yet I am strongly convinced that the ideal treatment is a prompt laparotomy. The arguments against inflation seem to me to be very strong. First, about 50 per cent. of intussusceptions are double, *i.e.,* a primary invagination of the ileum passes into, or through, the ileo-cæcal valve and carries the colon on with it. Inflation cannot in any way affect invaginated small intestine, as neither air nor fluid can be forced from the lungs to the small intestine through the valve. Secondly, it is most difficult to be sure that inflation has completed the reduction, as a small intussusception hidden under distended small intestines can with difficulty be palpated through the abdomen, and if reduction is incomplete, as evidenced by persistence of symptoms, much valuable time is lost. Thirdly, its danger, from rupture of distended or gangrenous bowel (D'Arcy Power). Yet when laparotomy cannot be promptly carried out, inflation has no doubt a place, not as an ideal, but as an expedient method of treatment. Of my nineteen cases, inflation was twice tried, and had failed in one case before I was asked to see it; but in all the others, the abdomen was opened as soon as a diagnosis was arrived at. I have no experience of laparotomy combined with inflation, as recommended by Kellock, in order to reduce the distal portion of the intussusception, for, in my experience, this is easy, and usually takes only a few seconds, and, if the invagination extends into the rectum, is much helped by an assistant's finger in the rectum pushing it upwards. Again, the air or fluid used for this purpose can only add to the contents of an already distended abdomen, and so hinder the closing of the abdominal wall, which is usually the only difficulty in the technique. It is my custom to make a free vertical incision, large enough to admit the whole hand, either through the right semilunar line, or through the right rectus, with its centre just below the umbilicus. So far as possible, the escape of the intestines is to be avoided, for I think it adds to the shock, and reduction is sometimes troublesome. The intussusception is then searched for in the region of the ileo-cæcal valve, and, if not found there, the small intestine is brought out of the wound, and systematically examined as far as the duodeno-jejunal junction; after which the large intestine is palpated from the cæcum downwards. When the intussusception is found, the apex is reached and the invagination quickly reduced by squeezing the apex towards the cæcum, and, until its reduction is becoming difficult, and the intussusception is felt to be fixed, all manipulation is carried out within the abdomen out of sight: then the cæcum is drawn out of the wound, and the manipulation continued, aided by traction on the entering ileum. If reduction is difficult, I push and pull with as much force as is necessary, paying no heed to rupture of the peritoneal, or even of the muscular coats; yet I am well aware that most surgical text books regard traction on the entering bowel as a bad practice. Personally, my one object is to reduce the invagination, for I know that, if I cannot do this, the patient will die, as I believe there is no recorded case of recovery after resection, under one year; so that, at the worst, forcible manipulation can only rupture the ensheathing layer and necessitate its suture, or an inevitable resection.

When an early intussusception is dealt with, the small bowel above the tumour often presents a curious flaccid, crinkled appearance, though, later, it gives place to paralytic distension. When this is marked, it is best to introduce a large trocar into the ileum, and milk out its contents from above, suturing the small hole with one or two Lembert's stitches.

The value of thus getting rid of the intestinal contents is not only seen in the greater ease, with which the abdominal contents are returned to the abdominal cavity, but also because much of the toxic products, which even after a successful laparotomy may kill the child, are by this method eliminated. If time permits, I suture the abdominal wall in three layers, peritoneum and aponeurotic layers, with catgut, and the skin with silkworm gut: but if the patient is suffering from shock, a single silkworm-gut suture through all the layers is usually efficient. The greatest attention must be paid to delicate manipulation, and to avoidance of undue traction on the mesenteric plexus, and, above all, the utmost rapidity in operating must be insisted on, and every necessary instrument and suture must be prepared, so that no time may be lost. For an uncomplicated case, 20 minutes is usually ample to allow, from the time of incision, for the reduction of the bowel and suturing in three layers, and sometimes it can be carried out in 15 minutes or less.

After Treatment.—While the abdominal wall is being sutured, attempts are made to induce the child to take warm milk and water from a bottle, and the cot is then placed in front of a good fire with the foot raised. Strychnine, hypodermically, is sometimes necessary, and half a pint of normal saline into the axilla is frequently employed. Feeding by the mouth is begun at once, with peptonised milk, milk and water, or Benger's Food, and, after 48 hours, a full dose of castor oil is given, unless the bowels have already acted satisfactorily.

Results.—In one of my cases, the abdominal wound broke open on the 13th day after the stitches had been removed. It was resutured. I have also resutured the abdominal wound made by another surgeon for intussusception in a baby. Both made uneventful recoveries. Mr. Wallace (*Clin. Soc. Trans.,* Vol. XXXVIII.) records two similar accidents. Of my 19 cases, under one year, 15 recovered from the operation, and were discharged from the hospital. Of the four deaths, one, a child of nine months, who was operated on 34 hours after the onset of symptoms, died of shock and toxæmia 20 hours later. One, aged three months, of 53 hours' duration, died five hours after operation, at which the intussusception was found to be irreducible, and a Paul's tube was put into the ileum. One, aged eight months, had suffered from acute symptoms for four days, and from less marked symptoms for three weeks; the bowel could not be reduced and was excised by Maunsell's method. He died five hours later. The last death suddenly occurred in a child, about eight months old, some days after the operation, from serous apoplexy. I have traced most of my other cases, and find that four have died; two of diarrhœa and vomiting, one of bronchopneumonia, and one of whooping-cough. Of the whole 19 cases, my mortality is 21 per cent., or, excluding the two irreducible cases, 11 per cent. I know of no statistics of cases, treated by inflation alone, giving a mortality in all cases of less than 50 per cent. Barker, to whom the greatest credit is due for bringing early operation into almost universal practice, gives, between 1892 and 1896, a mortality of 40 per cent. under one year. Sargent's statistics (St. Thomas's Hospital, 1892 to 1901) show, under one year, a mortality of 61 per cent. Wallace's 16 cases show a mortality of under 19 per cent., but he was fortunate enough to meet with only one irreducible case in his series.

Discussion of the methods to be adopted in irreducible cases is most unsatisfactory, as, under one year of age, no successes are recorded. I have performed resection for intussusception five times, of these four, all children, have died, and one, a man, with an acute exacerbation of pain and vomiting due to a chronic intussusception in the descending colon from a carcinomatous growth, recovered, so that I can make no suggestion as to what method gives the best chance of success in irreducible cases in infants.

THE MECHANICAL AND CHEMICAL EFFECT OF MILK ON THE HUMAN BEING.

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I.

Milk is the normal secretion of the mammary glands of all mammals, and the milk of all mammals has a similar composition, consisting of fat, sugar, albuminoids, mineral constituents, and small quantities of other compounds. The milk of the cow has been studied in greater detail than that of any other animal on account of the extended use of this animal's milk and the products derived from it as human food. Our knowledge of the chemical composition of cows' milk is indeed very complete, while studies, more or less incomplete, have been made of the milk yielded by woman, the goat, the ass, the mare, and the sheep. While there may exist a wide difference in the sustaining qualities of the mammary secretion of different animals as applied to man, this difference will be found not only in the chemical properties of the milk, as given by chemists, but we will also add that there is a mechanical effect which milk produces on the human tissues that must not be lost sight of. There is also a vitality which the animal has which produces the milk that is essential. This vitality is marked by certain characteristics which are all important and to which we will refer later. Briefly our scheme is to show the mechanical and chemical effect of milk on the human, and why the Holstein Friesian cow is the food-producing ideal. While the chemistry of the different constituents of milk is only in its infancy and it may seem premature to discuss such at this time, still for the purpose of this paper it will be quite necessary to hint at some of the obscure truths. A word first as to the individual constituents of milk. The fat for instance is of peculiar and complex composition; it differs from other fats in that it contains compound glycerine, it exists in milk in small globules and each globule is surrounded by a true membrane; now this last is a proven fact and I would ask you not to debate it for the present but bear it in mind for future use in the study of this paper.

The sugar in milk is also of peculiar nature; that of the cow's milk is called "lactose," or, more commonly, sugar of milk. It is generally assumed that all milk contains the same sugar, and while it may be so, it is a fact that the sugar of one animal seems to have a property not found in that of another; for instance, the sugar of the milk of the mare has the property of easily undergoing alcoholic fermentation, a property not possessed by the sugar found in cows' milk; so also is it a fact as stated by Carter that the sugar of the human milk is not identical with that of the milk of the cow though the properties seem to be the same. Again we find that milk sugar exists in several modifications which are distinguished from each other chiefly by their behavior under certain atmospheres, even polarized light being sufficient to break up milk sugar into a modification of itself. Our present knowledge of the albuminoids of milk is far from complete, though much work has been done on the subject; this is due to the fact that it is extremely difficult to obtain these compounds in anything like a state of purity. The milk albuminoids are bodies of complex composition containing carbon, oxygen, nitrogen, hydrogen, phosphorous, and sulphur; the way in which these elements are combined is not known, but that they exist differently in the milk of different animals is a fact borne out clinically rather than chemically. It is this fact undoubtedly that suggested the comprehensive term "Vitality" to Prof. Carlyle as related by Mr. Cortelyou in his address of the 20th annual meeting of the Holstein-Friesian Association; it was this fact that Prof. Holt had in mind when he said that in infant feeding there is a difference among the different breeds; it may be slight but that difference is shown on the delicate human organization and to my mind he must have had the Dutch cow in mind when he said, select a large, strong, healthy cow and the little difference will not be noticed, and follows up by cautioning the student concerning the fact that tuberculosis is more common in the Jersey than in any other breed. Taking up once more the albuminoids, we repeat that they differ in the milk of different animals; they may be divided broadly into two classes, those like the cow and the goat, which give a curd on the addition of an acid, and those like the human and the mare, which do not. Now the curd found in the cow is composed of casein, which is composed in the main of earthy phosphates, the presence or absence of which causes the difference in the albuminoids of the two classes. Besides casein there exists in all milks a second albuminoid called Albumin; this differs from the casein by not being precipitated by acids, but will be coagulated by heat. There are other albuminoids described in milk, but enough has been said excepting to allow me to reiterate that the elements found in the albuminoids vary in different animals and this without disturbing the general complex make-up of the milk.

Salts:—Henkel and Bechamp are about the only authority; they admit the presence of potassium, calcium, chlorides, phosphates and magnesium. Henkel has gone so far as to find an organic acid (described as Citric acid) which he has found at times in some samples of milk, and while this result is not universally accepted, for the sake of future reference please keep this point in mind. If you can only see with me that the atoms composing the different elements of which we have been talking are so delicately arranged, and the molecules built up in so complex a manner that they cannot be disturbed, you would then understand how even a slight change in some one element would make a vast change in the whole. This is so to such an extent that in a large percentage of cases where the milk is modified the child or invalid does not thrive. By some writers it is said that the reason that the milk of Jerseys does not agree with subjects of low vitality is that it is so rich in fat that when in combination with the digestive ferments it produces a substance that is absolutely toxic. This I feel is not quite true, the difference we will find to be a physiological and mechanical derangement, physiological in the fact that it is impossible for the large membranous covered fat globule of the Jersey to crowd through the microscopic cells of the digestive organs, which they do when assimilation is perfect, and if forced will indeed produce an active mechanical irritation resulting in numerous disturbances of the alimentary tract; while with the Holstein's milk the fat globules are so small that they readily pass by endosmosis through the cellular tissue. Prof. Holt in his summary from figures compiled from sixty thousand analyses collected by Mr. Gordon of the Walker-Gordon Milk Laboratories made from the American grades and common natives says, leaving out the Jerseys, the average of the different breeds of cows are remarkably uniform in their total solids. Now if it is a fact that there is little difference in the component parts between the Holstein and other dairy breeds, wherein are we to lay claim to this superior vitality in the Dutch milk? In two ways:

first, the chemical combination of all the elements of the milk. In one breed this combination will produce one result, while in another breed these elements combined will produce entirely different results; in other words, in one breed these elements are happily combined, while in others these same elements are opposed. How is this so? Well, just as one manufacturing pharmacist will make a certain preparation composed of two or more ingredients, the results when given to the body are good, another pharmacist analyzes the product and prepares as he thinks the same, but the results on the body is disastrous. Why? Because there is that lack of what is known in medicine as a happy combination. Now so it is between the different breeds, it would be so easy—although all the elements are present in a certain milk there might be that lack of harmony which would change the final sum. For instance, diamonds and charcoal, chemically the same, but such a gross difference in the completed substance. Now what would produce this lack of harmony in the different elements of milk in the several breeds (another claim to superiority) *i.e.*, the breed itself; the quality in a breed is one of the most important factors, and that which influences most of all these factors is, first, the duration of the purity of breeding without admixture of alien blood, and, second, the uniformity of type, and the inherent vigor of that type. It is doubtful if any breed of cattle has been bred pure for a longer period than the Holstein, and the inherent vigor of the breed is indisputable; it matters little with what breed or type a Holstein bull is mated the offspring is almost sure to resemble the sire markedly in characteristics, particularly so in color. Now I speak of this prepotency because it is the vital factor in holding all of the delicate arrangement of the molecular formation of milk in happy relationship. On the other hand take a breed of delicate constitution, nervous and predisposed to all outside influences, are they not more apt to cause an unbalanced condition of all those elements that go to make up the milk? If this is not so then how are you going to explain the fact where a hospitalful of patients (ranging from infancy to old age) fed on the milk of a certain breed; no matter how diluted or modified, failed to thrive, but when changed to the milk of the Holstein-Friesian a marked change was shown. I do not think I am presuming too much when I say that it would not be unreasonable to expect in two different milking breeds where all the elements of this great chemical combination are practically in the same proportion, that one ingredient not up to standard (low grade of phosphorus or poor sulphur, for instance), would sacrifice the whole. In other words the difference in the digestibility of one cow's milk over another is dependent upon the difference in their molecular arrangement and not whether they are rich in fat or not. The time is not far distant when the Boards of Health and city governments will insist not on a high grade of fat, but on a high grade of solids, a fine molecular combination and few bacteria as most hospitals do now. Right here, it might be pertinent to add, that a Walker-Gordon representative replied in answer to my question—if left with no other means of feeding infants than raw cows' milk, what breed would you choose? "Holstein," because it comes nearer a balanced ration than any other. To the Holstein breeders I will say you have in your breed all that can be desired for the production of a pure food product, to say nothing of other grand qualities, so don't waste your time trying to breed an absurdly high per cent. of fat to the detriment of inborn qualities, qualities that have made the Holstein-Friesian the head of all dairy breeds.

SOCIETY PROCEEDINGS

JOINT MEETING OF THE CHICAGO MEDICAL AND CHICAGO PEDIATRIC SOCIETIES.

February 27, 1907

DR. J. W. VANDERSLICE, President of the Chicago Pediatric Society, in the Chair

SYMPOSIUM ON SCARLET FEVER

(Continued from last month.)

ATYPICAL CASES OF SCARLET FEVER.—Dr. M. P. Hatfield said that for an atypical case we must have some standard of normality to differentiate from. A normal case of scarlet fever would be one, in his opinion, that is ushered in by vomiting, sudden rise of temperature, rapid appearance of the characteristic eruption, followed by desquamation, a mild nephritis, and convalescence or recovery. Any variation from this course of events would constitute, in his judgment, an atypical case. The number of anomalous cases in scarlet fever is almost beyond mention. He has tried not to cover the literature of these strange and wonderful cases, but referred briefly to some of the variations from the normal course of the disease in cases that have occurred in his practice in the hope that his experience might be helpful to others.

He has learned to be distrustful of vomiting as a characteristic or pathognomonic symptom of scarlet fever. Vomiting is so frequent in children that it is not noticed by the mother or attendant, so that he has ceased to place any great dependence on the presence or absence of vomiting in making a diagnosis of scarlet fever. In regard to the fever, it rises very suddenly, going up almost simultaneously with the vomiting, the backache, the headache, or sore throat of which the child complains. This is not invariable. He knows of cases of scarlet fever that have come on insidiously with slight malaise, slight indisposition on the part of the child, without any notable elevation of temperature. These cases would run a doubtful course, and yet be followed by a nephritis of the most discouraging character. One should not rely on the thermometer too implicitly in making a diagnosis of scarlet fever. However, the patient may have a temperature that will not exceed 101 deg. to 102 deg., instead of 103 deg. to 105 deg., which one expects to find in these cases. There is a class of cases in which there is a reversal of the ordinary temperature noted in scarlet fever, namely, the temperature is higher in the morning and dropping towards the evening; whereas one expects to find the reverse in a typical case of scarlet fever. One symptom to which he pins most of his faith is a characteristic angina. If one will look carefully into the throats of the sufferers during the first forty-eight hours, he will find in addition to the papular eruption, a stiffening of the uvula and arch of the palate, with the characteristic color which looks as though a fine camel's hair brush had been dipped in carmine ink and drawn over the surface. That has always been a satisfactory symptom to him. Later, there is general erythema or streptococcus infection. Diphtheria infection may mask this. The throat in scarlet fever may vary from the marked, well-defined punctate and erythematous throat to the very mild variety seen in nurses who have been attending scarlet fever patients. These nurses show a low grade of angina, with headache, backache, but more frequently a low grade of septic infection. He has seen it for years among nurses in the Orphan Asylum of the city over and over again during epidemics of scarlet fever. Nurses will have an affection of that kind, with no eruption, but simply heaviness, sore throat, and only a week ago two nurses came into his office suffering from modified or atypical scarlet fever contracted in that way.

In regard to the erythema, there are more variations in this than any single symptom found in the course of scarlet fever. The ordinary typical eruption closely resembles the shell of a boiled lobster. The tint is almost exactly like what is found on a blonde child. Moreover, if one will closely inspect the skin of a child with a glass he will find there is almost the identical formation of small red points or dots over the surface of the child's body. The eruption is expected to appear promptly, but in an atypical case it is long delayed; sometimes it may be so slight that the case is called scarlet fever without the erythema. This, he thinks, is a misnomer, because there is always more or less redness which may be found in the armpits, and particularly in the genital fissure. On the other hand, the rash may be excessive.

According to text-books, colored people are immune to scarlet fever. It ought to be said they are immune from the ordinary eruption. He cited a case of scarlet fever in a coal-black colored boy.

As to desquamation, he saw a curious case a few years ago in which there was a sloughing off of a cast of the whole upper lip. A peculiarity about the eruption of scarlet fever is that it leaves a white eruption about the mouth. One of the most serious variations in the type of scarlet fever is the finding of milk-white patches in the midst of unusually red and swollen rash. It is said to be due to localized paralysis of the arterioles, producing practically the same effect one gets by drawing a finger across the surface of the body of a scarlatinal patient. The persistence of this white mark, after short pressure on the surface of the skin, aids in making the diagnosis. Again, one hand, one leg, or one arm will refuse to effloresce. Only a few weeks ago he saw a patient in whom the eruption did not extend above Poupart's ligament. He made a satisfactory recovery without any drawback.

Finally, there is that atypical form of scarlatina which physicians dread, namely, scarlatina fulminans, which kills patients by the intensity of the toxines before the physician is able to make a diagnosis.

TREATMENT OF SCARLET FEVER.—Dr. Alfred C. Cotton said, so far as the treatment of this disease is concerned, the main indications are to support the patient and to aid in the elimination of the toxines. As it is a self-limited disease of unknown etiology, running in its typical form a well-defined course, with a tendency toward recovery, for which no specific medication is known, at least to him, reasoning by analogy from what little is known about infections, we may safely assume that the system posseses the power under favorable circumstances to deal with this infection. If the patient has not been handicapped by extreme debility preceding the infection, or by an erroneous therapy or mismanagement, the antitoxin mechanism under favorable metabolic processes will succeed in overcoming the invasion of the organisms that produce the toxemia. If we have any known means of promoting elimination, that casts out offending toxic material; if we can assist in any way without interfering with nutrition, which is essential to metabolism, then we may be of some use. It seems to him that along those two lines, furnishing pabulum for normal nutrition, and assisting in promoting elimination, will be the only rational method at present of dealing with the infection of scarlet fever.

Thus far sera in the treatment of scarlet fever have been disappointing. His results from the use of Marmorek's antistreptococcic serum have been far from satisfactory; hence he has abandoned it. The results from the use of Moser's serum, so far as he has been able to learn, have been unsatisfactory. Escherich claims to have reduced the mortality of scarlet fever one-half by Moser's serum.

The treatment of the intoxications, with high temperature, is inaugurated by free catharsis. Scarlet fever is no exception to that rule. Free evacuation of the bowels should be one of the earliest efforts. Heroic purgation, allowable in some other infections with high temperature, is contraindicated in many cases of scarlet fever. He believes in the value of mercurials, especially the mild chloride, as eliminants. It has been his custom to begin the treatment of scarlet fever with moderate doses of calomel, followed by a saline. If the temperature be high at the first sight of the patient an enema for evacuating the contents of the rectum and lower bowel is at once advised. As a rule, he avoids the use of so-called antipyretic drugs, as they have too pronounced a depressing effect on the heart and circulation. It is very essential to maintain the integrity of the heart's action and the vigor of the circulation. If nature is to furnish in the laboratory of the body an antitoxin from the circulating fluids, it is self-evident that the circulation should be maintained at its highest point. Measures to obviate stasis of circulating fluids are rational in the management of cases of scarlet fever. He has fallen into the habit of recommending the old-fashioned spirits of mindereri more than anything else. In the majority of cases he thinks it is indicated for its diaphoretic and diuretic action, with a very limited amount of cardiac depressant, even if it is not a cardiac stimulant. Too much medication is apt to disturb digestion, to irritate the stomach, and develop a gastroenteritis which may be troublesome in the majority of cases. The stomach, therefore, should be invaded as rarely as is consistent with the indications with anything which interferes with digestion, absorption or elimination. He believes that the most successful results, in reducing toxemia and incidentally lowering temperature, are obtained from the judicious use of hydrotherapy. He frequently finds himself differing with his former convictions in regard to this measure. Perhaps the result of experience of one or two cases in succession may lead him to doubt the wisdom of radical hydrotherapy as the radical advocates apply it. Many times there is not sufficient aid, intelligent nursing and care, to use cold baths for hyperpyrexia, that is, beginning at a temperature of say 90 deg., and gradually reducing within ten to fifteen minutes' time to 70 deg. or 68 deg. Some children will not endure a cold bath. Where the temperature ranges above 104 deg. or 105 deg. persistently, with symptoms of profound intoxication, he has seen beneficial results from cold baths. Where there is delirium, restlessness, quiet is restored, and sleep induced by the cold bath or the cold pack. No method can be arbitrarily recommended, as each case will furnish the indications on which to base the hydrotherapy. A tepid sponge bath will often quiet restlessness and promote sleep. Cold applications to the head, especially where there are delirium and great restlessness, aid in reducing the restlessness. Irritability of the patient may be reduced by inunctions. Further, inunctions may tend to prevent the spread of infection during the desquamation. There are some physicians, however, who object to these inunctions, believing that we need the skin for eliminative purposes. If lard or lanolin is used, perspiration will not be impeded. In fact, he has seen patients sweat profusely through a covering of lard and lanoline. The drying effect of high temperature is relieved by inunctions. Carbolic acid may be added to the lard or eucalyptus, which will frequently allay itching. One or two per cent. of salicylic acid added to lard or lanolin will promote exfoliation during the period of desquamation. He believes in bathing during the period of desquamation to promote elimination. Early vomiting rarely, if ever, requires treatment. It rarely persists after the first day or so. Too much emphasis cannot be laid on the necessity of treating angina in scarlatina anginosa. In young children the nasal mucosa is extensively involved, as well as the post-nasal mucosa; also the tonsils and fauces, a difficult area from which to dislodge putrefactive material which accumulates there, and which furnishes an ideal culture bed. Aurists condemn the practice of douching, irrigating and spraying too freely the post-nasal space in cases of scarlet fever, on account of the fear of carrying infection along the Eustachian tube to the tympanum; but it seems to the speaker that the physician may cleanse this space without increasing the danger of aural involvement, and with the hope of diminishing that danger by removing necrotic masses, membrane and secretions which adhere and undergo dessication and putrefaction, products of which are being constantly swallowed and tend to establish gastroenteritis or indigestion, which is so common a feature of scarlatina.

DISCUSSION

Dr. H. Manning Fish referred to coryza as frequent following scarlatina. Following an epidemic of the disease in 1900 in Paris, a French physician published a thesis based on a study of 37 cases of purulent nasal catarrh, 18 of which terminated fatally. Nasal catarrh of itself is not necessarily dangerous, but if the condition should persist and involve the sinuses, if free drainage is not established, it may cause serious complications either on the part of the eye, the brain, or by metastasis implicate other organs. One serious ocular complication following scarlet fever is disease of the optic nerve. As this condition generally appears during convalescence, it may manifest itself weeks, or even months after the child is about and playing. If a purulent empyema is present, by establishing free drainage of the sinuses, the acute optic neuritis will generally yield immediately. The treatment should be directed towards the sinuses rather than to the eye. A purulent empyema is frequently the cause of many cerebral complications, owing to the intimate vascular supply between the cranium, the orbit and the sinuses.

Dr. William L. Baum has searched high and low for a case of Duke's disease during the recent epidemic of scarlet fever, yet he has been unable to find a single instance which tallies with the description of that disease as described by Duke in the London Lancet. At the Cook County Hospital they rely on examinations of the blood in all cases in which the diagnosis is in doubt. They get many cases in which there is a history of vomiting, but, like Dr. Hatfield, he looks with suspicion upon any diagnosis of scarlet fever that is made on vomiting and fever alone. For that reason, the leucocyte count is of the greates importance. In the differential diagnosis between the milder forms of measles and scarlet fever, or other eruptive disorders, he always finds in the mildest forms of scarlatina a decided leucocytosis, which is of extreme value in the beginning of the disease. Even in the mildest cases there is enlargement of the epitrochlear glands, and also in about eighty per cent. of the cases the glands of the groin are enlarged. Any one of these symptoms taken by itself is not of very great importance, but taken together, even in the absence of eruption, they can be considered important.

He agrees with Spalding that the minimum period of isolation when a patient should be allowed to go to school is six weeks, no matter how mild the attack may have been. Infection can be transmitted as late as four weeks, and as long as the present system is in vogue of relying on the family physician, a small minority of whom are lax and who want to fumigate houses at the end of three weeks, just so long would there be a recurrence of the scarlet fever epidemics. Medical inspection of schools should be permanent, and the Chicago Medical Society through its Council should take the matter of medical inspection up and see to it that there are at least one hundred inspectors appointed for a certain period every year, and that such inspectors shall be responsible for conditions in their respective districts. Physicians who are lax in regard to establishing proper quarantine and in raising it too early are culpable.

Dr. H. B. Hemenway, of Evanston, said that since the first of August there have been reported to the Health Department of Evanston Ill., 223 cases of scarlet fever. The population of Evanston is variously given as from 22,000 to 25,000. The cases began in a scattered way in August, the 19th of August being the day when the first case was reported. Toward the last of August and the first of September there were several cases of the disease until the 13th of January. The total number of cases before the 1st of January was 25. During the month of January there were 184 cases. In that period, that is, from the first of August until the first of February, 88 per cent. used the same milk supply. The Borden Company furnished this milk. The cases of scarlet fever were not limited to any section of the city, school, church or society. The disease was not normally limited as to age. Out of 203 cases in the private practice of Smith and Octerlony, only two were over ten years of age. Out of 209, 93 were over ten. Above fifteen years, the record is:

AGE	NO.
16	9
17	3
18	6
19	4
20	5
21	6
23	1
25	3
26	1
29	2
30	3

And one each of ages 32, 33, 34, 35, and 40.

The Borden Milk Company supplied about one-seventh of the milk to the city of Evanston. This estimate was based on the number of wagons licensed and checked by other means to be correct. Although from this depot the Borden Company supplied Edgewater and Rogers Park, in Chicago, Wilmette and Kenilworth, the figures given are for the city of Evanston only. From August 28, 1906, to the present time there were reported to the Health Department 221 cases of scarlet fever, and in the large majority it was found that they were using Borden's milk, cream or condensed milk. When the first outbreak occurred last August, the company was asked to change its source of supply. It is now found that at that time a capper in the Genoa Junction plant was desquamating. His physician pronounced it a case of blood poisoning. Soon after this two of his working mates, Miller and Myers, had scarlet fever, and Myers was quarantined. More recently there was scarlatina in the families of farmers shipping milk from Genoa Junction, and other employees. There had been a few cases (7) reported in January up to and including the 13th. The number of cases reported each day in the month after that was as follows:

DAY	NO. OF CASES
14	13
15	35
16	28
17	18
18	20
19	19

20 (Sunday) ..	4

Total for week, 137
of whom only 2 did not use Borden's milk.

21	14
22	4
23	4
24	1
25	6
26	6
27	1
28	1
31	3

Total, ...177
of whom 88 per cent. were Borden patrons.

Dr. Parkes, Commissioner of Health, ordered January 15 that no more milk be received from Genoa Junction, and the company agreed to ship from Hebron. According to the best knowledge accessible, the first car from Hebron was shipped January 17. It was received January 18, but owing to the rules of the Milkdrivers' Union, it was delivered after breakfast, so that much of it could not be used until the next day. It was January 26 when the Chicago Health Department stopped the Wisconsin milk, and in that week, when Evanston had practically checked the disease, in Chicago the number of cases reported reached a high-water mark. In a large family hotel in Evanston (The Greenwood Inn), the speaker was informed that the only patron of the Borden Company was a woman who bought this milk for her baby. The child was the only person in the hotel who contracted the disease. All of this goes to show the necessity for a thorough and frequent examination, not of the milk alone, but of all connected with the industry, including the families of the farmers, the employees of the company, and the cattle. After the harm has been done, it is difficult to get definite information. Self-interest stimulates the guilty to hide the evidence of crime.

One thing more that is important: The process of butter-making and of condensing milk does not make them sterile. Evidence seems to show that cream is more likely than the milk to carry the disease. If so, may not many obscure cases originate from butter or condensed milk, which it is more difficult to trace than ordinary milk?

Dr. H. W. Cheney had the opportunity last summer of studying a series of cases of scarlet fever treated with Moser's serum in the wards of the Vienna Hospital. The action of the serum begins to manifest itself in from eight to twelve hours after injection, and is characterized by a marked fall in the temperature, oftentimes the temperature dropping to normal within twenty-four hours, and continuing there or nearly so. The pulse showed much the same change. The rash, when the injection of the serum was given early, either does not develop or fades away more rapidly than usual. Perhaps the most notable change is a marked betterment in the general condition of the patient. The patient begins to sit up and take notice; asks for food, and the severe symptoms, as restlessness, delirium, and somnolence, usually disappear. The change which occurs in the clinical picture is oftentimes more striking than that seen after the use of diphtheritic serum. The workers in Vienna in the Kinderkrankenhaus are convinced of the value of this serum. The serum has been used there since 1900. Before that time the mortality from scarlet fever at this hospital was 15 per cent. Since then the mortality has averaged less than 9 per cent.; whereas the mortality in the other hospitals in Vienna, where the serum was not used during the period since 1900, has averaged 13 per cent. The serum has been given in over 200 cases. Only the severest cases are injected with the serum. There are some objections to the use of the serum, as, for instance, the large dose necessary to be given at one time, namely, from five to six ounces. Scarcity of the serum is a great disadvantage. The expense of a single dose is great. Moser, Escherich, and their coworkers are fully convinced of the value of the serum.

Dr. O. Tydings said the successful treatment of scarlet fever rests principally upon treating the complications which arise during an attack of the disease. In his observation the most frequent cause of the serious complications arising from this disease has been due to diseased conditions of the nasal passages and throat. He believes, if we take a child with a normal throat and nose, that child will escape the severe phases of the disease; whereas a child that has adenitis and hypertrophied tonsils will suffer from the severer forms of the disease. He emphasized the importance of practitioners taking care of the nose and throat of children in scarlet fever, to see that they are properly protected against invasion.

EDITORIAL

ON MENTAL RESEMBLANCES IN TWIN CHILDREN.

The study of the similarities of physical conformation in twins has always attracted considerable interest and has been made the subject of many fascinating investigations and at times fanciful hypotheses. But the problem of mental resemblances has lagged behind that of the physical.

True it is that we have the classical girls' college basket ball team, where the "twins" on the same team are the "whole thing" and as each knows what the other is thinking, since she thinks it herself, this basket ball team remained invincible for the entire four years.

This is a story only, but it probably has more than a writer's imaginative underpinning, for if we follow the "Measurements of Twins" of E. L. Thorndike, published sometime past now in the Archives of Philosophy, Psychology and Scientific methods, we see that mental resemblances in twins are features, as striking perhaps, though more difficult of measurement, than the physical resemblances with which all are familiar.

In this monograph, based on a study of six mental traits in fifty pairs of twins from 9 to 15 years of age, the author has been able to bring out some extremely suggestive and stimulating facts. There is a striking resemblance which ranges high above that found in siblings (Pearson's term for non-twin children of a single family, with same father and mother), and Thorndike touches on the bearing of the comparative influence of heredity and environment as causes of human differences in intellectual achievement as elucidated in his study.

There is, he believes, well nigh conclusive evidence that the mental likenesses found in the case of twins and the differences found in the case of non-fraternal pairs, where the individuals compared belong to the same age, locality and educational system, are due, to at least nine-tenths of their amount, to original nature.

From his elaborate series of figures and summaries he finds that among one hundred twins, living and attending school in 1903-1904, the mental resemblances of a twin pair are about twice as great as those of a pair of siblings similarly chosen. Environment seems to count for little in the present tests, and it appears that the similarities are in all probability due to the influences resident in the germ cells.

He finds it difficult to assume even that original nature accounts for a moderate amount of resemblance and to explain the rest on the ground of similarities in training.

It might be assumed by some that the present study would point in the direction of pessimism in educational endeavor. Such a judgment is entirely superficial. While the importance of heredity is brougt out in strong relief, nevertheless the influences of the environment are very marked.

The present study involves only a limited number of mental traits and only serves to show the existence of and to measure one determinant of human intelligence.

The important lesson in pedagogics to be learned from this masterly study is: What cannot education do with a combination of hereditary and environmental factors?

ABSTRACTS

The Boy of Fourteen, What Shall be Done with Him?— The City of Berlin, Germany, says an editorial writer in the Medical Times, seems to have fixed upon a method of saving the boy who leaves school at fourteen from ignorance if he goes to work, and idleness if he is inclined to turn loafer when he leaves school. The educational laws of Illinois fixes the school age so that it may end at fourteen. Apprehension has been caused by the large number of boys who leave school as soon as they are fourteen years old. While it is true that the majority of these boys go to work it is also true that they do not seek, as a rule, means for further education. The Berlin law provides against this contingency. Many boys, leaving school at this age, become street loafers. It seems necessary that some measure should be taken to insure that boys who have left school are employed in some useful way and taught in special lines, or are compelled to return to school. Fourteen years is a dangerous age at which to turn the boy loose upon the community of which he may be a member. At an age when he is neither boy or man, going through the formative period of life that fixes his moral, physical and mental status he must be made of pretty good stuff if he is not sent wrong by the vicious associations he must meet in his daily life, especially in large cities. The ego is dominant, self-will is a controlling element and he insists upon gaining his experiences in his own way. Too frequently in large cities he does not gain good judgment by his experiences, and he ceases to grow upward and outward. His morals suffer and his physical being is wrecked by vice and vicious practices, that reflect their degenerative tendencies upon the future generation, for sooner or later these boys will marry. The city of Berlin has published the statistics of the first year of the operation of a law which compels boys who go to work to carry on their schooling until they reach the age of 17. Since Apr. 1, 1905, all boys who have left the schools are obliged to pursue courses of particular value to them until the end of the term of six months, during which they have reached the age of 17. These courses are of two kinds, those organized by trade unions, boards of trade, or special associations of workmen, and those conducted by the state. The boys for whom there is no provision made by the trade with which they are connected are compelled to enter the state schools and the whole instruction is under the direction of the local government. The duration of the instruction does not exceed six hours a week, and wherever practicable may be given in the workshop where the boys are employed. A system of fines and imprisonment is rigidly enforced for noncompliance with the law. A boy who does not attend class, or an employer who prevents an employee from attending, is fined from one to twenty marks and imprisoned from one to three days for each offense. During the last year 32,259 boys in the city of Berlin attended such classes, including both the workmen's associations and the city's schools. Of this number 22,813 were apprentices and the others were employed by commercial houses. The nature of the instruction varied, having regard for the special needs of the different trades. The ability to read, to write, and to perform simple arithmetical operations is presupposed, as the laws in regard to elementary education are not dead letters in Germany. The courses are therefore called professional, and are so practically. The boy between 14 and 17 is forming habits. It is to the interest of the employer as much as of the boy that he should form habits of study and should realize the possibilities of the trade into which he has entered often by chance and without special interest. The experiment which is successful in Berlin may be so in the large cities of our own country. Without compulsion of law there is no doubt that manufacturing or commercial houses which employ a sufficient number of young men would find it to their advantage to organize classes in which the brighter boys who have been obliged to leave school early may get a general insight into the nature of their calling and special technical knowledge.

Infantile Spastic Rigidity.—P. CANEL (Thèse de Nancy). The author has considered this subject in great detail and gives a full account of several original observations. The definition of Little's syndrome is taken as "cases of cerebral spastic diplegia, often congenital, or dating from the first few months of life, muscular rigidity being the essential symptom of every spastic diplegia. To the bilaterality and symmetry of the rigidity is added another feature, predominance in the lower limbs." Many types are included under this heading, such as the paraplegic form, generalized form, transitional forms, choreo-athetoid varieties. Although the causative factors are numerous, it is not possible to group the different conditions on a distinct etiological basis. There is absolutely no correspondence between the etiology and the clinical expression of the disease, and very little more between the etiology and the pathological anatomy. The author supports Cestan in his belief that there is no purely spinal variety of the affection, all pyramidal degeneration met with in such cases being secondary to the cerebral condition.

PEDIATRICS

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ORIGINAL ARTICLES

SEA AIR TREATMENT OF INFANTILE DIARRHEAL DISEASES*

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There is an opinion prevalent in the profession, and most writers on children's diseases make direct mention of the fact, that infantile diarrheal diseases are especially frequent, and work their greatest havoc in the crowded, poorer districts of large cities.

Assuming this to be a fact, the most natural inference that may be drawn therefrom is, that children living in country towns, or at the seashore, are, to a greater or less degree, exempt, or immune, or in some way less liable to such ailments. Such, indeed, seems to be the general impression.

As a result, it is rather a common thing in practice for physicians to order such cases away from the city, preferably to the seashore.

Now, it must be admitted, that by far a greater number of cases may be found in a city than in the country. But, it has long been a question, in my mind, whether this difference is not a question of mere numbers, rather than of proportions. I doubt if the percentage of cases to the thousand of population is much, if any, greater in the city, than in the country, and believe that the numerical difference is due to the greater population, rather than anything else. And I have failed to find, nor do I believe there is, any good reason for believing otherwise.

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*Read before the Pediaatric Section of the Kings County Medical Society, April 17, 1907.

The conditions under which children live, and are brought up at the seashore, are much the same as in the city, comparing the population, class with class. Overcrowding in small, stuffy rooms of seaside hotels or boarding houses, or in the hovels of the poorer sections of summer resort towns, does not differ very materially from overcrowding in city tenements. I have seen families of four, five and six persons occupying single rooms. The absence of the tall tenement at the seashore is more than compensated for as a causative factor in disease by the deficiency or lack of sewers, and the continued existence of rear yard toilets emptying into uncleaned and undrained cesspools. One may there as readily find the same filth and squalor, the same ignorance and miserable hygienic surroundings, and the same abuse of infants in the matter of feeding, as in a city.

Thus, given all the etiological factors of a summer diarrhea, one may confidently expect it to develop. Such seems to be a logical course of reasoning, and such is the actual state of affairs.

It is a fact that in Coney Island and vicinity, where, outside of a comparatively small section devoted to amusement enterprises, the atmospheric conditions are theoretically ideal, there is hardly an infant, two years of age, that has not suffered an attack of diarrhea, of some form or other, at some time during the summer months. I refer not merely to those infants sent to the seashore from the city, but to those born and raised there as well. The few that do escape are those, who, like a corresponding class of city babies, enjoy good hygienic surroundings, and have the care of intelligent mothers or nurses.

It follows, therefore, that the impression that children enjoy any particular immunity from diarrheal diseases, solely by reason of the fact of living at the seashore, is somewhat erroneous. These facts illustrate my first point, viz.: Sea air, per se, is not a preventive of diarrhea. The generally prevalent theory, that city children, suffering with enteric diseases, are greatly benefited by a trip to the seashore, is one that ought not to be unqualifiedly accepted. Actual experience, in private practice at least, does not seem to verify it. There are so many qualifying conditions to be taken into consideration, that the physician, who sends his cases away in a routine fashion, will, more likely than not, be grievously disappointed in his results. Of the hundreds of sick babies that may be seen lining the beach, the piers, and bathing house piazzas at Coney Island, on any hot summer afternoon, not many are improved, a goodly number grow worse; and the sight of a dead baby being brought to my office is no longer a novelty to me. My professional colleagues in the vicinity have all had similar experiences. For many of the cases that do improve, it might be claimed, as it has been claimed, without any great impropriety or improbability, that they would, or might have improved just as well at home.

This illustrates my second point, viz.: Sea air, per se, is not a cure for diarrhea.

In consideration of these facts, the most natural question that arises in one's mind, is, what foundation in fact, if indeed there be any at all, is there in the belief, or impression, that sea air is of any value in infantile diarrheal diseases?

The first evidence that may be presnted is that the various homes, fronting the ocean, do excellent work, and show remarkably good results in just such cases, and their work is almost exclusively among city children. Of course, it is admitted that they are unable to care for more than a very small percentage of afflicted cases; that the conditions under which they do their work, and their results, cannot be taken as a criterion in private practice. But, as far as it goes, this is evidence, is clear and definite, even if taken only as an indication of possibilities. My own observations in the last eight years, among infants born or raised at the seashore, or living there a considerable time during the summer, have taught me this: Our local babies, with few exceptions, do suffer with gastrointestinal diseases all sorts of cases, of all degrees of severity are met with even true cholera infantum is not rare. But, the severer forms of such diseases are relatively less frequent, the cases are of shorter average duration, and the results of treatment are far more gratifying. Of the deaths that occur, those of visiting children constitute by far the vast majority.

My third point, therefore, is that sea air is of considerable value. Such being the case, it ought to be advised in all suitable cases, as an adjunct to other treatment.

These various statements may appear to be conflicting, but are readily explainable. The poor results in the cases of visiting children, are due to certain definite causes, many of which are remediable, and all of which indicate their own remedies. A few of them are worth mentioning.

Many poor people delay too long before taking the trip to the seashore; in some instances, a week or more. Cases that are thus allowed to become too far advanced, might just as well remain at home, as the trip can do them absolutely no good.

The possible good effects of such a trip are undone by the fact that babies are not permitted to remain long enough. Most of them are taken for a day's outing only, returning to their city homes the same evening. This is not at all to be wondered at. The trouble, to many mothers, of dragging two or three or more other children along, the discomfort of a ride in a closely packed and jolting trolley car, which is the cheapest mode of travel, and therefore the one most generally used, and the expenses incidental to the trip, are often so great that it is seldom repeated.

Now, I believe that a single or an occasional trip to the seashore is of no more value than a single or an occasional dose of medicine in any other disease of equal gravity. A baby ought to remain not only during its illness but also all through convalescence. I have seen many recovered cases return with relapses, from which some have died.

Herein lies the only advantage which our local children enjoy. They are at home, and are at the beach, where they can be taken in a few minutes, every day, and practically all day.

I have frequently noticed, that, owing to the inconvenience of being away from home, or through sheer carelessness or ignorance, or by reason of the belief that sea-air alone would effect a cure, medicinal or other treatment for the diarrhea is usually entirely neglected.

I have also noticed that many mothers bring with them their lunches, generally consisting largely of solid food, of which the sick baby receives more than its just share. Others indulge themselves in the various edibles indigenous to the place, such as sausages, fried shell fish, chowder, etc., and which the baby frequently cries for—and gets.

Finally, the lack of facilities for the preparation of prescribed food, causes neglect in that matter, or the use of harmful makeshifts, to the detriment of the sick child.

As before stated, many of these causes are remediable; and the physician can do much in the way of instruction. But, unless they are all met and provided against, better results can hardly be expected than are now seen. A sick baby, that cannot be properly taken care of away from home, is just as well, if not better off by remaining at home. If, however, all conditions are complied with, in cases of children of average health and strength at the time of being attacked with a diarrhea, the results of sea air treatment will, I believe, be uniformly good. It is unfortunate that many people find it beyond their means to avail themselves of all the necessary conditions. These cases afford a rich field of philanthropic endeavor.

Just what the therapeutic action of sea air may be I do not know. But I believe it lies in the lower atmospheric temperature at the seashore. The nearer one comes to the water line, the cooler is the air; over the water, that is, near the end of a long pier, cooler still; while aboard a vessel in motion, it is at times quite chilly. For this reason, traveling by boat is better than by rail. For this reason also, I would advocate the establishment of more floating hospitals, and the building of seaside homes at the ends of long piers.

METHODS OF CALCULATING PROTEID AND ENERGY IN INFANT FEEDING*

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The criticism is being freely made that pediatricians have made infant feeding too much a question of chemistry and mathematics. The inference, unwarranted though it may be, which many are drawing from these criticisms, plainly is to throw chemistry and mathematics to the dogs, take whole or diluted cow's milk or skim milk and feed it to the baby, and if the baby survives continue the treatment. Now there are some babies so hardy that they will withstand almost any amount of ill-treatment, and this is undoubtedly the explanation of the advocacy of some of the unreasonable, unscientific feeding we see or hear about. It must be remembered that mere survival is not the object of infant feeding; what we desire is to so feed the baby that in the months to come it shall have a high resistance to disease, continuous good health and an abounding vitality.

I am unconvinced of the uselessness of chemistry and mathematics. It needs no argument, it seems to me, to prove to the physician who would intelligently guide the feeding of infants that he cannot afford to ignore the many and very important chemical questions which are constantly arising and which the intelligent and honest physician must at least try to solve if he would be just to himself and his patient, and true to his profession.

So far from inducing me to make infant feeding a question of less mathematics I am firmly convinced that we need more and better mathematical training along this line. Let us quit regarding infant feeding as so many recipes which some indulgent pediatricians have worked out for us, and which we have written down or memorized. Instead, let us take the matter seriously. Let us master the fundamental mathematical principles and calculations. Then instead of regarding mathematics in infant feeding as a bugbear we shall regard it as a friend and shall delight in the aid it gives us.

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*Read at the Southern Branch, Chicago Medical Society, January, 1907.

So convinced am I of the correctness of this position that I am giving considerable time to the simplification and to the teaching of the mathematics of infant feeding. Hating recipes and schedules with a perfect hatred, and vividly remembering my own difficulties in working out plans by which I might, in a reasonable time, make the calculations necessary to intelligently prescribe a food containing a known definite amount of fat, proteid, sugar and energy, it is only natural that I should try to make the mathematics of infant feeding as simple as possible consistent with a knowledge of what the baby ought to get and how much of each of the ingredients of his food he is getting. But while we try to make our mathematical problems as simple as possible we must still bear in mind that the solutions of these problems will always require some thought and skill and, therefore, our task is not to devise schedules or even formulæ which it is supposed anyone can apply to a group of babies but perhaps cannot apply to the particular baby which may just then be his problem. The task is rather to convince that mathematical calculations are necessary to intelligent pediatric work, and that these calculations can be mastered and must be mastered if we are to do good, rational work.

Food is essentially proteid and energy. In the adult these two factors are practically all we need consider, for the fats and carbohydrates are interchangeable. With infants, however, the fats are more difficult of digestion and the amount of fat, therefore, must often be limited. Instead of giving, as is usually done in the first few months, two or three times as much fat as proteid, we find that the child will frequently do better when the fats are reduced to an amount equal to or even less than the proteid. On the other hand when the fats are reduced much below the proteid it is difficult to obtain the requisite amount of energy without either increasing the sugar to the point of nauseation, or increasing the proteid unduly, and, as a not infrequent consequence, deranging digestion or throwing too much work on the liver and other organs of metabolism. All our infant food problems then center about these four, the proteid, the energy, the fat and the sugar, and our calculations are almost entirely concerned with these.

Of first importance, it seems to me, is a knowledge of how much proteid the baby should get and how much he is getting in the food which is given him. Next in importance is a knowledge of the amount of energy a baby should get and how to prescribe a food which will not for any length of time, furnish too little or too much energy.

To make this last calculation we need to know the amount of fat, proteid and sugar, or other carbohydrate—in the food. It is therefore convenient, though not necessary, to know the percentage of each of these constituents in the food. It is necessary to know the total amount of each in 24 hours in order to calculate the daily energy. It is not necessary to know and plan a uniform percentage composition for a week or even for a day. The variation, however, should not be great. I believe it to be an advantage to vary the amounts in different feedings, *e.g.*, to give 4 ounces at one feeding and 4.5 or 5 ounces at the next, and it does no harm to slightly vary the percentages. This is easily done by making the food more or less dilute, thus a four-ounce feeding containing two per cent. proteid is easily changed to a five-ounce feeding containing only 1.6 per cent. proteid by the addition of one ounce of water.

This simple expedient is frequently all that is necessary when the stomach shows symptoms of irritability, and it has this advantage, that it can be resorted to without in any way changing the relative proportions of fat, proteid and sugar or the total daily amounts of these.

I have just said that in calculating the energy which the daily food of an infant supplies we must know either the percentage composition of the food and the quantity in ounces of the food given daily, or the total daily quantity of each of the constituents in ounces. In deciding on either of these we are guided by certain general principles which I assume are about as follows:

1. The proteid should be sufficient for the cell-growth and repair in the tissues of the infant. If it be lower than this the child will lack in vitality and resistance to disease. If it be much higher than is necessary the metabolic processes will be unnecessarily burdened in converting to lower nitrogen compounds the excess proteids and in getting rid of these.

2. The energy should range between 35 and 45 calories per pound of the baby's weight. It should not exceed 45 for any long period, nor fall much below 35. This energy-quotient, as it is called, is from fifty to one hundred per cent. higher than that of an adult man at moderate work.[1]

3. The fats and carbohydrates, the energy-producing factors, may vary considerably so long as they are kept within the limits of comfortable digestibility and taken together do not bear too great or too small a ratio to the proteid.

4. The nutritive ratio, that is, the relative amounts of energy-producing and tissue-building elements, in the baby's food should lie between that in mother's milk and that in the well-balanced diet of an adult. In other words it seems advisable to me to imitate, within certain limits, the nutritive ratio in mother's milk, gradually increasing the relative amount of proteid, or, which amounts to the same thing, reducing the relative amount of energy-producing elements until by the eighth or tenth month the ratio has become equal to that in the diet of an adult.

The necessary calculations then are concerned with these three, the absolute amount of proteid, the relative amount of proteid or the nutritive ratio which I shall simply call ratio, and the amount of energy.

In fixing the ratio it will be necessary to calculate fat or sugar or both, and in calculating the energy we need to know either the daily amount of proteid and the ratio, or the percentage composition of the food, and the energy-equivalent of an ounce of fat, an ounce of proteid and an ounce of sugar, but, as I shall show, a proper regard for the ratio will obviate the necessity of calculating the energy except at the beginning and at infrequent intervals during the period of bottle-feeding.

In addition to these calculations regarding proteid, ratio, and energy, we may still have to make some calculations which will enable us to write out for the mother or nurse a simple method by which the desired amount of proteid, energy, fat and sugar can be obtained with approximate accuracy. These calculations, that is, the calculations necessary in preparing a food which shall have a known, definite amount of proteid and energy, and a definite ratio I shall have to reserve for another time, confining this paper to the three things I have just mentioned, the proteid, the ratio and the energy.

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[1] The maximum requirements of an adult man weighing 150 lbs. engaged at light muscular work or in a business or profession are 4.5 ounces of proteid and 3,300 calories of energy, that is, the energy-quotient is 22.

This is explained by the greater radiation of heat and the more active metabolism in the infant.

PROTEID

In regard to the proteid the necessary calculations are first, the amount to be given in 24 hours, and second, the percentage of proteid in the food, or, if this is already fixed, the daily quantity of food in ounces through which the total proteid must be distributed in order to give the desired percentage.

To establish a standard daily amount of proteid P[2] for the average healthy child it is necessary to know

1, the weight of the baby; 2, how much mother's milk such a baby would require in a day, and 3, the average proteid per cent. in this mother's milk.

A study of the cases of Haehner, Ahlfeld, Feer and others shows us approximately the daily quantity of mother's milk received by a baby of average weight. The proteid in mother's milk ranges from one to two per cent., the average being probably about 1.75 per cent. Allowing for the chemical and physiological differences between mother's and cow's milk, we may begin with a modified cow's milk in which the proteid may be less but not more than one per cent., gradually increasing the proportion until during the fourth month the baby may be taking 1.75 per cent.

From these considerations I think it is safe to assume that the daily quantity, the daily proteid and the proteid per cent. which an average healthy child should receive would be approximately as indicated in the following table. In this table I have placed a column showing the average weight in pounds at the age indicated and another column which I have called the proteid quotient, *i.e.*, the quotient obtained by dividing the daily proteid in hundredths of an ounce by the baby's weight in pounds and which means the per cent. of an ounce of proteid required for each pound of the baby's weight.

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[2] The large capital P is used to represent the daily proteid, the small capital ᴘ the proteid per cent., Q the daily quantity of food in ounces, and W the weight of the baby in pounds.

TABLE I

Age.	Daily Quantity.	Proteid Per Cent.	Daily Proteid.	Weight.	Proteid Quotient.
1 week.......	12	0.75	.09	7	1 1.5
2 weeks......	18	1.00	.18	7¼	2 2.5
3 weeks......	20	1.25	.25	7½	3.0
4 weeks......	21	1.50	.31	7¾	3.5
2 months....	24	1.50	.36	9	4.0
3 months....	28	1.50	.42	11	4.0
4 months....	30	1.75	.52	13	4.0
5 months....	32	2.00	.64	15	4.0
6 months....	36	2.00	.72	16	4.5
7 months....	40	2.00	.80	16½	4.5
8 months....	40	2.00	.80	17	4.5

The daily quantity is given in ounces, the daily proteid in hundredths of an ounce and the weight in pounds.

It will be seen that the daily proteid after the first month is approximately 4 to 4.5 times the weight in pounds, and that during the first month the proteid-quotient is approximately the same number as the week of the baby's age. We therefore dispense with the table and keep in mind the following rules deduced from it:

To calculate the daily proteid P.

1. During the first month. Multiply the baby's weight by its age in weeks, that is, $P=W\times Weeks$.

2. After the first month. Multiply the baby's weight by some number between 4 and 4.5, that is, $P=4W$.

The next operation connected with a consideration of the proteid is either to arbitrarily fix the proteid per cent. as in the table above, and from this and the daily proteid calculate the daily quantity of food, or to fix the daily quantity and calculate the proteid per cent. Since the number of ounces in which a certain amount of food can be given is a more elastic quantity than the strength of the proteid, it seems to be better to fix on the maximum proteid per cent. and then calculate the number of ounces which must be taken to furnish the daily proteid already decided on. We are guided in fixing the proteid per cent. by our knowledge that up to the fifth or sixth month the baby will get sufficient proteid with the percentage two or less[3], and it need not be even as high as this if the food is diluted. Suppose, for example, the baby is two months old and weighs 9 lbs. We have decided on the daily proteid as

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[3] See Table I.

36 hundredths of an ounce (9×4), and knowing that something less than 2 per cent. of proteid is a suitable strength for the food we fix on say 1.5 per cent. To determine the daily quantity of food divide 36 by 1.5. The quotient, 24, represents the number of ounces of a food containing 1.5 per cent. of proteid that must be given in order that the baby may obtain the required .36 oz. Had we decided to feed the baby 1.33 per cent. proteid then we should have to feed 27 ounces ($36 \div 1.33$) in order to get the .36 oz. required. We may therefore make the following general statement:

The Daily Quantity=The Daily Proteid divided by the Proteid Per Cent.

Or $Q = P \div p$.

We may, however, decide on the approximate daily quantity first and then calculate the proteid per cent., always remembering that the quantity is elastic and may be increased if the quantity first decided on would necessitate giving too high a proteid per cent.

A method of estimating this tentative quantity is suggested by a comparison of the weight and quantity columns in Table I. The ratio between the daily quantity in ounces and the average weight in pounds at any age except during the first week is seen to fall between 2 and 3. We may, therefore, consider that the average quantity of food in ounces which a child should take in any one day is approximately 2.5 times (between 2 and 3 times) his weight. We may therefore forget all about the table and remember simply

$$Q = 2.5\ W.$$

Suppose, for example, that for a baby 6 months old and weighing 16 lbs. we have decided on the daily proteid as .72 oz., that is, $P = 4.5 \times 16$, and the daily quantity as 36 oz., that is, $Q = 2.25 \times 16$. The proteid per cent. would then be 2, that is, $p = P \div Q = 72 \div 36$.

If we should desire to make the per cent. of proteid less without decreasing the daily proteid we may increase the quantity to 40 ozs. (2.5×16) by adding water, when we shall have a proteid per cent. of 1.8,

$$p = P \div Q = 72 \div 40.$$

To again illustrate these calculations let us suppose that we are to determine the daily proteid, the proteid per cent., and the daily quantity in ounces of food for a baby 2 months old and weighing 10 lbs. We may proceed thus:

$$P = 4W = 4 \times 10 = .40 \text{ oz.}$$

$$\text{p determined partly by the age} = 1.6\%$$

$$Q = P \div p = 40 \div 1.6 = 25 \text{ ozs.}$$

Or in this way:

$$P = 4W = 4 \times 10 = .40 \text{ oz.}$$

$$Q = 2.5W = 2.5 \times 10 = 25 \text{ ozs.}$$

$$p = P \div Q = 40 \div 25 = 1.6\%$$

If 1.6 per cent. appears to be too high, or proves to be too high on trial, we may add 5 ounces of water, reducing the proteid to 1.33 per cent. without in any way lessening the quantity of food or the amount of proteid in the twenty-four hours.

RATIO

After having decided on the amount of proteid and the per cent. of proteid in the daily food of the infant we next calculate the amounts of fat and sugar which together will be necessary to give the ratio which we desire shall obtain between the proteid and the energy-producing constituents of the food.

To guide us in establishing a minimum and maximum ratio we take into consideration the nutritive ratio in mother's milk and the ratio in a well balanced diet for adults. In mother's milk the ratio ranges from 8 to 12, averaging about 9. In a properly balanced diet for adults the ratio of the energy-producing elements to the proteid is about 5 to 1. It seems reasonable, therefore, to begin with a ratio about 9 or 10 and gradually reduce it to 8, 7, 6 and 5, the last mentioned being reached about the eighth or tenth month. I have set down here my own idea of how the ratio should change.

TABLE II

Age.	Ratio.		
First month	12 to 8,	average	9
Second and third months	9 to 7	"	8
Second three months	8 to 6	"	7
Third three months	7 to 5	"	6
Fourth three months	6 to 5	"	5

The maximum ratio is 12 and the minimum 5. The nutritive ratio at any age should lie between these. The ratios I have suggested are tentative but I believe they will be found to be very nearly correct.

It may be thought unnecessary to keep in mind any limits to the ratio as it would seem that most infant foods would naturally fall between these limits. A very limited examination of the modified milks and the proprietary foods in common use will show that in these the ratio often runs as high as 20 and as low as 2, *i.e.*, in the former case the baby is being fed almost exclusively energy-producing food, and in the latter case the food is too largely tissue-building and the energy needed must be obtained from food primarily intended for a different purpose.

Having decided on the nutritive ratio, whether 5, 6, 7, 8, or 9, we next select a food having first, the desired per cent. of proteid, and second, the desired ratio. Almost all the top milks in common use may be made to yield foods of these ratios, depending on the amount of dilution and the amount of sugar added, but the whole milk containing 4 per cent. fat and 4 per cent. proteid and the twenty-ounce top milk containing 6 per cent. fat and 4 per cent. proteid I find to be most convenient. The following examples are given to illustrate the different ratios in whole milk and in twenty-ounce top milk.

TABLE III.

A. Whole Milk with Sugar Added.

Fat.	Proteid.	Sugar.	Ratio.
1.00	1.00	7.00	9
1.25	1.25	7.00	8
1.50	1.50	7.00	7
1.75	1.75	6.50	6
2.00	2.00	5.50	5
2.00	2.00	6.50	5.5

B. Twenty-Ounce Top Milk with Sugar Added.

Fat.	Proteid.	Sugar.	Ratio.
1.50	1.00	6.50	10
1.50	1.00	5.50	9
2.25	1.50	7.00	8
2.50	1.75	6.25	7
3.00	2.00	7.00	7
3.00	2.00	6.00	6.5
3.00	2.00	5.00	6

From these tables two facts are very evident, first, slight changes in the ratio are readily made by merely changing the

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[1] See last two ratios in A and last three ratios in B, Table III.

amount of sugar[4]; second, when the sugar is kept nearly constant the ratio varies with the dilution, the greater the dilution the greater the ratio. In other words, if we begin with a dilute milk, whether a whole or a top milk, and keep the sugar nearly uniform, gradually lessening the dilution, the ratio will also gradually lessen. Or to state it in another way, by gradually increasing the fat and proteid—increasing each proportionally—and keeping the sugar uniform, the ratio will take care of itself and we will have no need to keep or memorize any table.

But in every case where we are beginning bottle feeding, and this may be at any time during the first year, if we are to know what the baby is getting it will be necessary to make some calculations in which the ratio is involved. The minimum daily proteid is readily fixed—P=4W. Next, we may fix either the fat or the sugar. If we fix the fat, during the first three or four months it will be best to make it equal the proteid, that is, use whole milk, and when we desire to increase the fat without increasing the proteid fix it at one-and-one-half times the proteid, that is, use twenty-ounce top milk. By fixing the proteid and the fat we can readily calculate the amount of sugar which must be added to make the food conform to any proposed ratio. Instead of fixing the fat we may fix the sugar at approximately 7 per cent. and then calculate the fat required to make the food conform to the desired ratio. The former plan, however, is the better one for the reason that the fat is oftener than the sugar a source of difficulty, and, therefore, must be more carefully controlled.

To make either of these calculations we need to know the relative value of fat and sugar as energy producers. These values and their relative importance are here given.

TABLE IV.

Energy Equivalents.

1 oz. fat yields 264 calories.
1 oz. proteid yields 116 calories.
1 oz. sugar yields 116 calories.
.01 oz. or 1%.
Sugar or proteid yields 1 1-6 or 7-6 calories.
1 oz. proteid is equal to 1 oz. sugar.
1 oz. fat is equal to 2¼ or 9-4 oz. sugar.
1 oz. sugar is equal to 4-9 oz. fat.

The first and more common problem then is this, the proteid, the fat and the ratio being fixed, how shall we calculate the amount of sugar needed to give the ratio desired? Let us take an example and deduce a general formula. Suppose the baby weighs 15 lbs. and is 4 months old, and that it has been decided to give it a food of ratio 7 containing a half more fat than proteid[5]. It is required to calculate the sugar needed to fulfil these conditions.

The Proteid, $P=4W \quad =4\times 15 \quad =.60$

The Fat, $F=3/2P = 3/2\times 60 = .90$

It is desired that the sum of the fat and sugar—the fat being converted into its sugar equivalent—shall be 7 times the proteid, therefore,

The Fat and Sugar, $F+S=7P=7\times 60=4.20$

The Sugar alone $=7\times 60-9/4\times 90$[6] $=2.05$

From this must be deducted the sugar already present in the milk in order to determine the sugar to be added. The sugar in the milk may be assumed to be the same as the proteid, and therefore,

The Sugar to be added, $S=2.05-.60=1.50$

or in one expression,

$$S=7\times 60-9/4\times 90-60$$

The general formula then for the sugar to be added becomes,

$$S^{7}=PR-9/4F-P$$

which can be simplified to

$$S=P(R-1)-9/4F$$

This formula can also be applied in determining the sugar per cent., for example, in the foregoing case supposing the proteid to be 2 per cent., then the fat would be 3 per cent. and the sugar would be

$$PR-9/4F$$

$$7\times 2-9/4\times 3=7\%$$

but for the sugar to be added we have,

$$S=P(R-1)-9/4F$$

$$=2\times 6-7=5\%$$

We may therefore make the following general rule for calculating the sugar to be added:

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[5] This would be twenty-ounce top milk diluted.

[6] Nine-fourths of 90 in the sugar equivalent of the fat alone.

[7] S represents the sugar to be added, R the ratio and F the fat.

Multiply the proteid by the ratio less one, and subtract 2¼ times the fat. The result represents hundredths of an ounce.

In those comparatively few cases in which the control of the sugar seems to be more important than the control of the fat we fix the proteid and sugar and calculate the fat, for example, in the case which has just been used as an illustration had we fixed the proteid at 2 per cent. and the sugar at 7 per cent.; then our reasoning would be as follows:

Equivalent of $F+S=PR=2\times7=14\%$ Sugar
The Sugar alone.............. $=7\%$ Sugar
Equivalent of Fat.....$=14-7=7\%$ Sugar
Therefore Fat......$=4/9$ of $7=3\%$

The general formula then for determining the fat is

$$F=4/9(PR-S)$$

and we may make the following general rule:

From the product of the proteid by the ratio subtract the sugar and multiply by 4/9.

ENERGY

Our next calculations have to do with the energy. Here, as with the proteid, we need to know first, what is a proper amount of energy for the baby, *i.e.*, we need a standard, and second, how much of the particular food decided on must be used to furnish the required energy

First as to a standard, if we assume 45 calories per lb. of body weight as the maximum for continuous feeding we shall not be far astray. No attempt should be made to maintain absolute uniformity of this energy quotient. It is quite proper that it should vary from time to time, but it should not for any long period exceed 45 calories per lb. or be less than 35 calories per lb.

If, with me, you consider the proteid and the ratio of first importance, then you will already have decided on the daily proteid, the proteid per cent. and the daily quantity of food, and all that is left for us to do is to calculate the energy which this daily food will furnish, and then from this and the baby's weight calculate the energy quotient. To calculate the energy we need to know the daily proteid and the ratio; for example, suppose it has been decided to feed a baby 5 or 6 months old weighing 16 lbs. a food which shall have a proteid content of 4.25×16 or .68 oz. and having a ratio of 7. It is required to calculate the amount of energy which this food will furnish. We reason thus:

The fat and sugar are equivalent in energy production to 7 times the proteid.

Therefore the fat, sugar and proteid are equivalent to 8 times the proteid, or — since proteid and sugar are equal in energy-producing value[8] — to 8 times .68 oz. of sugar.

Now each .01 oz. of sugar yields 1 1/6 or 7/6 calories of energy, and therefore the energy which this food will produce is $7/6 \times 68 \times 8 = 635$ calories, and the energy quotient is

$$635 \div \text{baby's weight} = 635 \div 16 = 40$$

Stated generally then, to find the energy quotient:

Take 7/6 of the daily proteid, multiply by the ratio plus one and divide by the baby's weight in lbs.

This general rule is expressed by the formula

$$E.Q. = 7/6\ P\ (R+1) \div W$$

In calculating the amount of food required to furnish a given amount of energy it is frequently desirable to know the energy furnished by one ounce of the food. This it will be seen is readily obtained from the formula

$$E = 7/6\ P\ (R+1)$$

and the formula for the energy quotient could also be expressed thus:

$$E.Q. = 7/6\ P\ (R+1) \div W$$

What should be done if the food gives a higher energy quotient than is desired? We should lower the ratio by taking less fat or less sugar or less of both, in this way not disturbing the important element, the proteid, which at 4W is about the minimum for continuous feeding. Generally the desired result can be obtained by simply reducing the sugar, each level tablespoon less of cane sugar reducing the energy by 60 calories and each tablespoon less of milk sugar reducing the energy by 50 calories, and a level teaspoonful of these by 15 and 12 respectively.

If the energy quotient is too low the simplest way to correct the feeding is to increase the total quantity of the food.

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[8] See Table IV.

This increases the proteid as well as the fat and sugar, but not beyond a reasonable amount. The number of ounces of food to be added is determined by the desired increase of energy divided by the energy of each ounce of food. Practically this is accomplished by adding 1 ounce[9] of whole milk for every 20 calories of increase desired, 1 ounce of twenty-ounce top milk for every 25 calories of increase, or 1 ounce of fourteen-ounce top milk for every 30 calories of increase desired.

TABLE V

Composition of a few milks and the energy furnished by one ounce of each.

	Fat.	Proteid.	Sugar.	Energy.
Skim milk	0	4	4	10
Whole milk	4	4	4	20
Twenty-ounce top	6	4	4	25
Fourteen-ounce top	8	4	4	30
Nine-ounce top	12	4	4	40
Cream, 16 per cent	16	4	4	50

The numbers representing the fat, proteid and sugar are hundredths of an ounce or per cent.

The energy is expressed in calories.

The energy that can be obtained from an ounce of any milk, whether plain or diluted, is determined by multiplying the total sugar equivalent by 7/6, that is,

$$7/6(2\tfrac{1}{4}F+P+S)$$

for example, the energy obtained from one ounce of whole milk is

$$7/6(2\tfrac{1}{4}\times 4+4+4)=20$$

To one who has practised these calculations in his work even these simple formulæ are unnecessary, but it usually is helpful for a time to memorize or keep in one's pocket or prescription book a few formulæ. The most useful are probably the following:

$$P=4W$$
$$Q=P\div p$$
$$M=P\div 4$$
$$S=P(R-1)-9/4F$$
$$E.Q.=7/6P(R+1)\div W$$

All these formulæ are of general application, but the sugar formula may be simplified when used in prescribing special milks, thus when whole milk is used $F=P$ and the formula becomes

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[9] See Table V.

$$\begin{aligned} S&=P(R-1)-9/4P \\ &=P(R-3\tfrac{1}{4}) \end{aligned}$$

When twenty-ounce top milk is used $F=3/2P$ and the formula then becomes

$$\begin{aligned} S&=P(R-1)-9/4\times 3/2P \\ &=P(R-4\ 3/8) \end{aligned}$$

In practice we say

$$S=P(R-4\tfrac{1}{2})$$

or

$$S=P(R-4\tfrac{1}{4})$$

When fourteen-ounce top milk is used $F=2P$, and then the formula becomes

$$\begin{aligned} S&=P(R-1)-9/4\times 2P \\ &=P(R-5\tfrac{1}{2}) \end{aligned}$$

To show that these calculations can be rapidly and easily made let us take the following example:

Given: Baby 3 months old, weight 12 pounds, ratio desired 7, P. 1.5, F. 1.5, *i.e.*, whole milk.

Required: The daily proteid, P., the quantity of food in ounces, Q, the quantity of whole milk needed, M, the sugar which must be added, S, and the energy quotient, E.Q.

Solution:

$$\begin{aligned} P&=4\times 12 &&=48 \text{ i.e., } 4W \\ Q&=48\div 1.5 &&=32 \text{ i.e., } P\div p \\ M&=48\div 4 &&=12 \text{ i.e., } P\div 4 \\ S&=48\times 3\tfrac{3}{4} &&=1\tfrac{3}{4} \text{ i.e., } P(R-3\tfrac{1}{4}) \\ E.Q.&=7/6\times 8\times 1/12=37 && \text{ i.e., } 7/6P(R+1)\div W \end{aligned}$$

I have said that I would not in this paper discuss methods of preparing the food. It may, however, help to give a little more completeness to this article to suggest how these figures we have just obtained are to be interpreted. The first, the daily proteid, is used only in the succeeding calculations. These it will be noticed are all related to it and it has no use outside of these. The last enables us to say whether the baby is getting too much or too little energy. From what has been said it will readily be seen that if we desire to increase this energy quotient to 39 we shall need 2×12 or 24 more calories, and we know that this energy can be supplied by a little more than one ounce of whole milk. The other three results are interpreted and written down for the guidance of the mother or nurse thus:

Take

Whole milk	12 oz.
Sugar	1½ oz.
Boiled water to make	32 oz.

THE ORTHOPEDIC EXAMINATION OF CHILDREN.*

By Henry Ling Taylor, m.d.

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AND ATTENDING SURGEON HOME FOR CRIPPLED
CHILDREN AT HAWTHORNE.

The key to orthopedic diagnosis in children is to remove the clothing and to examine them all over. More than half of the frequent and serious errors are due to failure to follow this simple plan.

It will help vastly if one has a definite idea of what is to be looked for, and the determination to find an adequate cause for the symptoms.

One should note primarily disturbances of form and function and only secondarily seek to determine the pathological cause.

In general terms the examiner should look for weakness or laxity, stiffness or spasm, wasting, swelling, tenderness and deformity of the trunk and limbs, and particularly of the joints, and note their presence or absence.

The examination begins the moment the patient enters. Even if the child is carried, the color, expression, nutrition, posture, movements and general demeanor should give valuable information, while if the child walks, the gait, attitude and movements should be critically studied.

The tip-back head, retracted shoulders, stiff back, and careful movements of Pott's disease, the waddling gait of bilateral congenital hip dislocation, the weak floppy or dragging walk of poliomyelitis, the stiff spastic gait of cerebral palsy and many others are practically pathognomonic. If the patient walks, one may observe at once whether lameness is present on one or both sides, and whether the gait indicates weakness, stiffness or tenderness, and at which joint. All the movements should be carefully studied and deviations from the normal noted, also whether handling and undressing the child causes pain. While this is going on the main points of the history are ascertained, and particularly if there was a difficult labor, if there was any injury or abnormality at birth; what was the manner of feeding and state of health during infancy; whether the child had been injured or had had one or more attacks of illness; what had first attracted attention in connection with the present affection; what had been the symptoms, their duration and order of development; whether they had come quickly or slowly and with or without constitutional symptoms.

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*Read before the Clinical Society of the New York Post-Graduate Medical School and Hospital, Dec. 21, 1906.

The child being now completely undressed, is asked to walk, to lie down and get up, and to pick up some small object. It is then examined standing for spinal stiffness or deformity and for pelvic obliquity. It is then placed recumbent and later procumbent on a couch and the spine examined for stiffness and antero-posterior and lateral deformity; the limbs examined for weakness, wasting, and inequality of length, and the larger joints for pain, heat, tenderness, swelling, stiffness and spasm.

In making these tests it is necessary to get the child's confidence, all abrupt and rough manipulation should be avoided, and it is rarely necessary to cause pain.

From such an examination one should be able to decide whether the trouble is local, central or general, and if local which part is affected; secondly, whether the trouble is congenital, traumatic, static, paralytic or pathological; if pathological, one should have a pretty definite idea of the particular nutritional or infective change in question.

In arriving at an exact diagnosis the examiner is much assisted by definite information on certain points in child physiology and pathology.

The baby should hold its head up and begin to use its hands at three months, sit up at six months, creep at eight months, and walk and say a few words at fourteen months. There is large individual variation, but failure to do these things within two or three months of the normal time often indicates disease or abnormality. Failure to hold up the head may indicate hydrocephalus or other cerebral defect, idiocy, malnutrition or rickets. Failure to sit properly may also indicate any of these. Creeping is often omitted. Failure to walk at one and one half to two years may indicate rickets, myxedema, joint disease, or paralysis. Unduly delayed talking may indicate unusually slow development or some form of mental impairment.

Young babies should be examined by the obstetrician for congenital deformities, and also after difficult labor for birth injuries, including head-injury, sterno-mastoid injury, brachial plexus rupture, and fracture of the clavicle and femur. In the first six months the joint infections are usually purulent, rarely tuberculous; in the second six months, if you see a baby with tender epiphyses, look out for scurvy. Rheumatism is rare in young children, very rare in infants and in monarticular form; though the various joint infections, scurvy, and the attacks of poliomyelitis are often so diagnosed. From the second to the fifth year, rachitic deformities, joint and spinal tuberculosis and poliomyelitis are very common. Poliomyelitis often passes for an attack of indigestion until the fever subsides and weakness in the legs is noticed; congenital hip dislocation is rarely discovered until the child begins to walk.

The static deformities due to over-weighting (non-rachitic) weak ankles, knock-knees, round back and scoliosis occur after infancy and through adolescence. The typical age for the development of coxa vara and non-pathologic postural spinal deformities is from eight to fifteen. Such troubles, except coxa vara, are not painful; even the flat foot of childhood is usually painless.

Striking symptoms often indicate trouble at a distance, as the knee pain of coxitis and the abdominal pain of spondylitis. Night cries are frequently symptomatic of spinal or joint disease.

In many cases of bone and joint disease a good X-ray plate is a valuable diagnostic aid.

The writer recommends the careful examination of all children at birth and at least once a year thereafter, in order to detect and correct deforming affections in their incipiency. Many serious conditions are painless and extremely insidious and easily escape parental observation for years. It is the duty of the family doctor to recognise beginning deformity, and by proper measures to preserve the symmetry and competence of the bodily framework.

THE RUBBER TEAT AND DEFORMITIES OF THE JAWS. *

By Tom F. Pedley, M.D.,

RANGOON, BURMAH.

The subject to which I beg to invite your attention is the use of the rubber teat and "baby comforter," and their giving rise to certain deformities of the jaws, irregularities of the teeth, nasal obstruction, and other diseases in infancy and childhood.

The dieting and care in the rearing of European and other infants form an important part of the work of the general practitioner in Rangoon. The difficulties of hand-feeding are much greater in the tropics than in England. I believe, too, that with Europeans residing in these climates it is more frequent and more an absolute necessity to resort to the feeding bottle than at home; for here often European mothers, from compulsion rather than from choice, fail wholly or in part to suckle their offspring. In many, however anxious they may be to perform this all-important function, there is a failure of milk secretion after a few weeks or months, and artificial feeding, with all its dangers and difficulties, .becomes compulsory. The importance of one factor in this process is the use of the ordinary indiarubber teat, and later, the introduction of what is regarded by so many people as the harmless dummy teat or "baby comforter." This last product of perverted ingenuity, and the effects of its use in the mouths of some of my little patients, has opened my eyes to serious evils which I now believe arise from the defective form, and the too prolonged use of the artificial substitute for the mother's breast. I have for years consistently protested against the careless and prolonged use of the feeding-bottle, and, in most cases, succeeded in curtailing its use, also in abolishing the "comforter" from the nurseries of my patients. But with some obstinate and indulgent parents all arguments have failed until the mischief which I wish to describe has been brought about.

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*Abstract of a paper read at a meeting of the Burmah Branch of the British Medical Association, B. M. G.

On examining during sleep the mouths of some bottle-fed babies of say between the ages of 18 months and 2 or 3 years, one may see between the parted lips, that though the jaws are closed, there is a gap between the upper and lower incisor teeth which will sometimes admit the tip of one's little finger, also that the child is breathing through its mouth. These conditions will be found to be the more pronounced the longer the child has been fed with the bottle or used the "comforter." When both have been used, as they so often are, until after all the temporary teeth have been cut, the deformity is very severe.

If we watch an infant in the act of taking its natural food we see that it opens its mouth to the fullest extent, and takes a mouthful of its mother's breast; not only the nipple, but a large part of the areola disappears. A mother will tell you that she feels that the nipple goes far to the back of her baby's mouth. At the same time the tongue is protruded over the whole of the lower gums and often over the lip, and its edge may be seen in the angles of the lips. Thus, an infant 3 months old takes into its mouth a soft tough mass which, when its jaws close upon it, measures from 1 in. to 1½ in. wide, ½ in. in thickness, and 1 in. to 1½ in. long—a flattened truncated cone which, when subjected to the pressure of the tongue and the jaws, comes into contact with the larger portion of the palate and the upper gums and the upper surface of the tongue. The nipple itself forms a small part of what an infant a month old takes into its mouth. The everted lips lie around the base of this soft cone, with slight, if any, contraction.

In the act of feeding at the breast the jaws hardly close. The lower jaw is raised to squeeze the pap against the upper gums and the palate, a wave of contraction passes along the intervening tongue from its tip to its base, in the latter part of which movement there is some retraction of the body of the organ, which in this closed cavity makes for suction, then its approximation to the palate pushes the milk into the pharynx to be swallowed. The milk which is contained in the distended ampullae immediately above the nipple is squeezed out rather than drawn out by suction. The jaws then separate to admit more milk into the flaccid apex of the breast for the process to be repeated; the first part of this effort of expression is aided by the lower gums biting inside the upper. The cheeks are passive, the whole act is peristaltic, the alternating pressure and relaxation exerted by the jaws and tongue being analogous to that which the milker imparts with his fingers to the teat of the cow.

The muscular effort becomes stronger as the meal terminates and ducts empty of secretion. But in a healthy woman there is under normal conditions always more than enough for her child. Mothers have repeatedly told me that it is more a matter of the baby drinking than sucking, for the milk often flows from the other nipple at the beginning of the meal. From such breasts an infant will fill its stomach in from eight to fifteen minutes. I have often watched and timed the meal.

Compare this natural process with what one constantly sees when the ordinary feeding-bottle with the common rubber teat is used, and one is impressed with the extraordinary defectiveness of the substitute for the human breast. The common teat is usually 1 in. to 1½ in. long. That portion which lies between the lips is cylindrical and less than ½ in. in diameter. The lips have to be screwed up to grip it, while the tongue folds in its length round a narrow body lying upon its dorsum—an elastic and resisting material which, when pressed against the upper gums and the palate, can only touch a comparatively small and central portion of those surfaces. The bulkiest and broadest part comes into contact with that portion of the palate which in nature receives the apex of the cone. The flow of milk through its orifices, is usually far too slow; it must be drawn out by suction and cannot be increased much in volume by the recurring pressure of the jaws; at the same time air usually must be admitted through its orifices to the bottle to allow of milk being extracted. The cheeks, instead of remaining full and passive as in feeding from the breast, are visibly pushed in by atmospheric pressure. If you place your little finger in your mouth and suck it, you will feel the edges of your tongue fold round it and away from your teeth. Do the same with two fingers as a baby does at the breast, you will feel that your tongue is lying over the biting surfaces of your incisors and most of your lower teeth. Try to suck 2 oz. of water from an ordinary feeding-bottle; it will make your jaws ache for half an hour.

If we have in the past given this matter a thought, we have come to the conclusion that Nature has especially and mercifully endowed the infant with great powers of suction. This is an error, for the muscles concerned should not be called upon to do much more than those of a man drinking from the hollow of his hand.

The mechanical effects of the prolonged use of the common rubber teat for feeding are now often added to and exaggerated by the use of the dummy teat or "baby comforter." This thing is usually the same shape as the bottle teat; often it is smaller and more resistant. It is commonly placed in the baby's mouth immediately after it has been fed from either the breast or the bottle, and is sucked for hours, day or night, until a habit is contracted which is most difficult to break. On the slightest sign of restlessness, or without any reasonable pretext, the dummy is pushed into the infant's mouth; often it is picked up from the floor and given to the child, or hung round its neck so as to be handy. Sometimes it is dipped into sugar or smeared with jam to render it more acceptable. Apart from its mechanical effects upon the jaws and teeth, its use, to my mind, is obnoxious and uncleanly, for it introduces into the child's mouth dirt and microorganisms, and causes an abnormal secretion of saliva detrimental to digestion.

The defective shape and resiliency of the artificial teat, the severe muscular efforts demanded of the tongue, and its altered shape in sucking it, the extra muscular pressure of the lips and cheeks, the enormously increased atmospheric pressure upon the cheeks and jaws, are all abnormal influences which must have injurious effects upon the delicate bony tissues of the infantile maxillae, and interfere with their proper growth and development. The ossifying junctions of the maxillae, the premaxillae, and the mandible are subjected to these unnatural influences during a long period when they are most liable to be injured. When these processes are prolonged, as they often are, until the temporary teeth have all been erupted, or even into the third or fourth year, it is not surprising that the alveolus containing the upper incisors, both temporary and permanent, should be pushed forward, for the bulk of the premaxillae is alveolus. At the same time the upper alveolar arch, instead of broadening, is compressed transversely by the atmospheric pressure upon the cheeks. This, with the pressure of the bulk of the teat against the palate, destroys the symmetry of its concavity by preventing the descent which accompanies natural development. The palatal arch may thus remain abnormally high in the centre, and sometimes becomes V-shaped.

This is the most important factor in the causes of those deformities of the tender bones above the palate which accompany abnormalities of the nasal cavities, and obstructions of those passages. With a narrowing of the tranverse diameter of the nasal fossa, there is a buckling of the septum, approximation of the deflected vomer to the displaced turbinated bones on one side, or of any or all of these delicate bones to each other, with obstruction to, or abolition of, nasal respiration; there is abnormal height of the palate between the first permanent molars, and often it is ballooned instead of V-shaped. Mouth-breathing is secured by the mouth being habitually kept open until the approximation of the molars prevents the front teeth from meeting. The upper incisors not having the guidance afforded by biting outside their lower antagonists, are subjected to the constant and unrestrained pressure of the elevated upper lip, which alone may have corrected early protrusion. They may even incline inwards, and the alveolar arch between the canines be flattened. However much a varying atmospheric pressure may aid in the production of this deformity, the primary cause is the pressure of the rubber teat upon the palate.

With many children who are breast-fed, and who have only used the "comforter" or the bottle for a short time, it is probable that the natural pressure of the lips and tongue may mitigate the deformity; but where both teat and "comforter" have been long used, the damage is, I believe, irreparable. With multitudes of young children in Europe, the size and shape of the palate varies with the extent to which such influences have been brought to bear upon the plastic and growing tissues. When the deformity becomes pronounced the lips cannot be closed except by effort, and the upper lip becomes habituated to its elevated position. When the lower lip once falls inside the upper temporary incisors, their malposition, and that of their successors, is confirmed and incurable. Where bottle-feeding has been carried on from birth, there is sometimes to be found narrowing of the arch of the lower jaw from contraction of the symphysis during the process of ankylosis and the first nine months of infantile life. Even where the normal ankylosis of the two halves of the lower jaw has not been interfered with, it is obvious from what is known of the plastic growth and development of the alveolar process that the external pressure of the teeth of a contracted upper jaw must influence the position of the lower teeth and the alveolus which supports them. So that while the basal portion of the lower jaw may be normal in its curvature, the alveolus which is built upon it may at its upper margin form a contracted arch in which the lower teeth slope inwards, while those of the upper jaw take an outward slant. Here there follows a narrowing of the space between the permanent canines and a huddling of the lower incisors, a common irregularity which cannot be ascribed to premature loss of the lower temporary incisors through caries, for they are the least liable to decay. The use of the bottle teat and dummy fortunately does not affect the development of the lower jaw and the position of its teeth, as it does that of the upper, because the tongue is interposed between the object sucked and the alveolus, both before and after the eruption of the teeth.

Irregularities of the milk teeth are of little importance when an individual tooth or two is affected, having little to do with the position assumed by the successors; but where the whole alveolus containing the temporary teeth with the crypts of developing permanent teeth, is displaced, deformities and irregularities must follow. Undue prominence of the permanent upper incisors is often ascribed to heredity; I believe that this is, in the main, an error. The use of the rubber teat with the feeding bottle has become so much more prevalent during the last two generations in Europe that these troubles are induced in parents and children, being subject to the same artificial cause. For instance, we find that the teeth and jaws of Eurasians, whatever may have been the dental peculiarities of their European fathers, are wonderfully good, regular, and well-developed, as in the native races, the vast majority of them being breast-fed. Irregularities amongst these people are so rare, that they attract one's attention, and an artificial cause is usually to be ascertained. Feeding-bottles are sometimes used by the Burmese and other Easterns of our polyglot population. Where formerly a Burmese mother could not suckle her child, she got another woman to do so. Now the bottle is resorted to, especially amongst the poorer classes, for wet nurses are expensive. Most of such children in Rangoon die of intestinal troubles; the earlier the artificial feeding is begun, the sooner they die. A few are given the bottle after having had the breast for a few months, so that they have had a good start; but their troubles soon begin, for one often finds failure to properly cleanse the rubber teat and its appurtenances, pipes, washers, shields, etc.; not seldom are they foul or smelling putrid. I suppose that the poor and ignorant classes in England, amongst whom hand-feeding is far more common, are not more careful than mothers out here. Apart from all the difficulties of obtaining pure cow's milk and of adapting it to the digestive powers of the infant, the feeding-bottle, as commonly used by these people, introduces into the mouths and alimentary canals of these infants numerous micro-organisms, from which the breast-fed are free. Amongst those who are struggling bravely with the bottle for existence, and those who have come out of the fight more or less damaged, we have opportunities of watching the diseases of modern child life as seen in civilized countries of the West. Many troubles unknown to the breast-fed children of the poorest and most ignorant of the native races, catarrhal and parasitic stomatitis, and ulcerations about the gums and palate, are often met with, due to friction of the rubber teat, and micro-organisms introduced by its uncleanliness. Unfortunately the use of the feeding-bottle is with Europeans and others continued long after it might well be abandoned, even into the second and third year; then from dirty teats and stale milk one may find caries of the upper incisor teeth, and even of the first lower molars before the canines have been erupted. One may often see tonsillitis started at a very early age amongst these children, and careful examination of the mouth and back of the throat reveals a state of disease which easily accounts for any amount of subsequent trouble in the form of hypertrophy of the tonsils and of the pharyngeal mucous membrane. Several Eurasian boys and girls, upon whom during the last few years I have found it necessary to operate for hypertrophy of the tonsils and adenoids, were without exception bottle-fed.

In Dr. Goodhart's *Treatise on the Diseases of Children,* he draws a vivid picture of the sufferings arising from hypertrophy of the tonsils and adenoids. He says:

> First, it leads to snoring when the child sleeps—not in itself a matter of much concern; secondly, to deafness from the pressure upon the orifices of the Eustachian tubes and the associated hypertrophic or inflammatory changes which take place in the surrounding mucous membrane. This is of importance because such children often appear dull and stupid simply

because they are deaf. It interferes, too, with free vocalisation and gives a nasal twang to the voice. It causes frequent cough. Lastly, by partial occlusion of the air passage, the lungs fill badly and the chest becomes distorted, and it is said that from the want of full use, the nostrils contract, the upper jaw fails to develop, and in consequence the arch of the palate remains high, and the teeth become cramped from want of room. The chest becomes pigeon-breasted—that is to say, the ribs are flattened in laterally—and the sternum and costal cartilages become prominent, sometimes quite pointed.

Across many such pages in our books of reference and many columns by writers upon this matter in our journals, one would be justified in writing the words "Caused by the rubber teat." Seeing and knowing what we do of the extreme rarity of these diseases amongst the many different races, nationalities, and types around us, one reads with wonder of 2,000 cases of operation for adenoids in a Liverpool hospital, or the patriotic appeal of a writer in the *Lancet* as to the national importance of subjecting tens of thousands of children in England to operations for this disease. It is most difficult to believe that if these troubles were in the past anything like as prevalent amongst our own people as we see them now to be, they could have so entirely escaped the notice of the masters of our art. It seems more reasonable to inquire as to the advent of some recent and widespread cause of what should be regarded as diseases of modern life. I believe that the cause lies here—artificial feeding—and that with defective appliances.

The conclusions which I have come to, and the suggestions which I wish to offer for the prevention of these evils are: When an infant is deprived of its mother's milk and has to be fed by hand, the substitute should be quite different in shape and consistency to the patterns now in vogue. It seems so difficult to make, even in indiarubber, a good imitation of Nature, that it would be much safer to be satisfied with providing a soft end to the spout of a vessel from which the infant is to be fed, and through which the milk can be gently and slowly poured into its mouth.

No harm can result from a baby drinking without sucking.

As a substitute for the common rubber teat, I recommend the use of a good-sized soft rubber finger-stall; a baby a week old can accommodate the end of one which will fit a man's thumb. Such a teat may be used on the spout of a vessel like a feeding cup, or an ordinary feeding-bottle. If this teat is properly adjusted, and the cup properly held so as to regulate the flow, there is no need for a shield, and the teat will not go down the baby's throat. Some of my little patients have taken quite readily to this method. Finger-stalls may be obtained in different sizes, are soft, flaccid, easily cleansed, and cost little more than the ordinary teats.

But a baby three months old can quite easily be taught to drink from a cup. At this age, then, I would recommend that all teats and bottles be thrown aside, and that we should revert to the old-fashioned metal pap-bowl with the long open lip. Our grandmothers for many generations back (before American ingenuity brought us the rubber teat) fed the children from such vessels in pewter. We can have handy-shaped, easily cleansed, and unbreakable cups of this description in aluminum or silver. Of course, the baby "comforter" or "pacifier" must be abolished and forbidden; its use is injurious, and if after warning resorted to, should be deemed an indictable offence.

Lastly, every mother who can suckle her own child should do so. Much might be done by the State and philanthropy to encourage this ancient custom amongst the ignorant and illiterate of all classes of our population; for ignorance is accountable for much that is cruel. Many women might suckle their children, but will not; for any such the neglect of this duty should be deemed a crime. If those who in the past ages gave the sacred laws which rule our lives had foreseen! If He, the Friend of the little children, had imagined that such glorious women as ours—English women—could withhold their breasts from their babies, what denunciations, what protests, would have been recorded against this unnatural and unwomanly sin!

One may envy Meyer of Copenhagen his reputation, and the benefits which his discovery and treatment of adenoids has brought to thousands of suffering children; but "higher merit," as our Burmese friends would say, awaits those who, in the names of humanity and patriotism, will persuade our women to remember and to fulfill the first duty of a mother.

Postscript. London, September, 1906.

Returning to England for a brief holiday after many years of residence in Burmah, I am intensely interested to find that the subject of this paper is intimately connected with questions which are now deeply engaging the attention of the profession and practical philanthropists. I feel that the publication of the facts which I have collected, and the views here imperfectly set forth, may do a little to assist in solving some of the problems of our cruel infantile mortality, and the prevention of a group of diseases which is maiming and disfiguring so many of our people.

To one accustomed for years to the beautiful feature of healthy and regular teeth of many Asiatic races, the unconcealed evidence of disease which disfigures the smiling faces of so many men, women, and children in this country, is a distressing and painful experience.

I find that the museums of the dental and other hospitals contain numerous models such as I have collected, and am assured by London dentists of the widest practice that these cases are as common as blackberries in England.

I have lately visited many different parts of the country. Wherever I go the extraordinary prevalence of the use of the dummy teat has astonished me. In the streets or travelling by rail, I meet this thing; the children playing on the sands have it in their mouths. In tens of thousands the mischief has been done, they are shamefully disfigured for life. It seems to me that the arrest of this evil is as deserving of the attention of our legislators as many of the subjects to which they devote so much time and energy.

What great responsibility rests upon us as a profession in regard to all these matters! but now is our opportunity; never before have our countrymen been so willing to listen to the advice of those to whom they must look for guidance in all that concerns their health and physical well-being. Let us endeavor to act up to our responsibilities, and with a united and decided voice denounce the many preventable causes of disease, which are doing so much to sap the vigor and to impoverish the blood of the splendid race so envied of all the world.

REMARKS ON THE TREATMENT OF ACUTE DYSPEPTIC DIARRHEA IN INFANTS

By Max R. Dinkelspiel, M.D.,

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There are three well-defined principles which should be recognized in every case of diarrhea in infants, before treatment can be instituted on a scientific basis, principles which although manifestly self-evident are nevertheless in a large percentage of cases very difficult to enforce. They are first, absolute co-operation on the part of child's attendants with faithful carrying out of the physician's instructions; second, the maintenance of hygienic conditions as near the ideal as possible; and third, the recognition of the fact that diarrhea is but a symptom, not a disease, and a condition expressive of various etiological factors, some of which are not always necessarily located in the intestinal tract.

While the question of co-operation on the part of the parents or other attendants is often assumed, I feel convinced that if statistics on the subject could be obtained the results would be confirmatory of frequent neglect. It requires an attendant of firm executive ability, and of absolute loyalty to the physician's instructions, to withhold food for thirty-six hours, to sponge a child that is burning with fever with very cold water, to leave the windows of the room open day and night in even moderately cool weather, to sterilize feeding bottles every two hours, to withhold food from an over-fed child when it is crying for it, and to perform a multitude of other procedures which may be erroneously interpreted by the mother or her relatives and friends as hardships. Sympathy, while it may naturally cause us to overlook or condone such neglect, ought nevertheless not prevent us from imperatively insisting, when necessary, that the recovery and often the life of the child may be in the balance, and dependent upon the faithful execution of the above named measures.

That hygienic measures are of paramount importance in the treatment of diarrhea of infants, is a fact which is readily perceived when we consider the proportion of cases occurring under unhygienic surroundings. This is one of the reasons why these diarrheas are so prevalent during the warm weather, and why they so readily improve at the seashore or other places where fresh air, the absence of congested districts, and more cleanliness are in evidence. I am sure that the establishment of large resorts for the infants of the poor, either at the seashore or in the country, during the warm weather, would prove lasting monuments of philanthropy, much more so perhaps than libraries, scholarships and the like, for many a child cannot live to enjoy such bequests for want of fresh air, pure water, proper food and adequate attention.

Food and external temperature have such a profound influence upon the cause of infantile diarrhea, that we can safely look to these two agents when considering the prophylaxis. It is furthermore a statistical fact that almost an overwhelming majority of gastro-intestinal disturbances in infants, especially in summer, occur in those that are fed artificially. It is an unfortunate condition, yet true, that the increasing tendency for many mothers to shirk the responsibility of nursing for the sake of personal convenience, is largely responsible for artificial feeding, and consequently for the increase of infantile diarrhea and the attendant mortality. The gastro-intestinal tract of an infant is such a rudimentary canal as compared to the adult that nature is not lightly interfered with. It is obviously often impossible to entirely remove the children from the heat of the summer, yet it is often possible to have them outdoors all days, and sometimes even during the night. The clothing of the child should be no more than is absolutely necessary to insure prevention of exposure of its body, and to insure cleanliness. It should be given an abundance of clear, cool water at regular intervals, and it should receive daily the benefit of a cleansing bath.

If the child is artificially fed the bottles should be thoroughly sterilized before each feeding. It is far better to place in the bottle the exact amount of food to be given and to refill it at a subsequent feeding. When not in use the nipples should be immersed in a mild boric acid solution. When feeding the child its head should be raised sufficiently to facilitate deglutition, and after the feeding its mouth should be thoroughly cleansed with a soft linen rag and sterile water. After each evacuation of the bowels it is not always sufficient to simply cleanse the genitalia, but they should be gently washed with a boric acid solution, thoroughly dried, and then dusted with some mild antiseptic powder.

Given a case of acute dyspeptic infantile diarrhea, the very first thing that is indicated, if the child is seen at the onset of the trouble, is to clear the gastro-intestinal tract of its contents, whether the onset has manifested itself by diarrhea, vomiting or convulsions. For this purpose castor oil has stood the test of time. I am accustomed to administer from a teaspoonful to a tablespoonful, according to the age of the child, and the drug should be administered boldly. Food of all description should be absolutely withheld for twenty-four hours. If vomiting is excessive, calomel one-tenth grain, with sodium bicarbonate one-half grain, should be given every half hour until one grain has been administered. During the time that the child is without food, albumin water can be given, to which, if there is any tendency to extreme weakness, from ten to thirty drops of whiskey can be added each time. In order to be sure that the intestinal tract has been thoroughly emptied of its contents, high colonic irrigations of warm normal salt solution are beneficial adjuvants. The gastro-intestinal tract having been thoroughly emptied, the condition of the child may rapidly improve; but if the irritation and toxemia have been profound the treatment has only begun. The strength of the child must now be restored, the diarrhea must be checked, all predisposing causes eliminated and individual symptoms combated as they may be present or arise.

There are three important methods at our disposal for the checking of the diarrhea, viz., by the administration of astringents, such as tannic acid, bismuth, etc.; the prevention of putrefaction and fermentation, by means of drugs such as phenyl salicylate, and by means of remedies tending to arrest peristalsis, among which opium heads the list. If bismuth is administered it should be done boldly, from ten to twenty grains every two hours. Bismuth is of value only in proportion to the promptness with which it checks the diarrhea, and if it does not do so within twenty-four hours I usually discontinue it. I have seen more satisfactory results occur from the administration of the tannic acid preparation known as tannalbin, as advocated by Vierordt (Deutsche Med. Wochenschrift, 1896, No. 25). This drug must also be administered boldly, from ten to fifteen grains from four to five times daily, and sometimes more if necessary. As its action is chiefly intestinal we must not procrastinate in the dosage, as it is upon the intestines that it exerts its influence, and where its influence is desired. If we are dealing with a case of excessive peristalsis, opium is indicated, and while I think it ought to be a *dernier resort*, it is invaluable when the indications are clearly defined. I have found the camphorated tincture of opium usually all that is necessary in from five to thirty-five drop doses according to the age of the child and the exigencies of the case. Paregoric will not only do good by checking the peristalsis and the diarrhea, but it gives rest to a bowel which has been more or less damaged. In critical cases strychnine is indicated in from one four-hundredth of a grain to one two-hundredth of a grain according to the condition and age of the child. High fever calls for thorough hydrotherapeutic measures according to the power of reaction on the part of the patient. In cases of otherwise uncontrollable vomiting daily gastric lavage by means of a mild solution of bicarbonate of soda and water is very beneficial in the majority of cases.

The resumption of feeding and the character of food depend upon as to whether the child has been breast-fed or artificially fed. In the case of breast-fed children nursing should be carefully resumed, a little at a time. It is often of advantage before each nursing to administer from ten to twenty drops of essence of pepsin. In the case of bottle-fed infants the food should be well diluted and gradually and cautiously increased in strength, not in proportion to the amount the child will take, but according to the amount and strength it can digest and assimilate.

THE DETECTION OF MENTAL DEFECT IN SCHOOL CHILDREN.

By C. K. Clarke, M.D., LL.D., (Toronto.)

Last June I took part in a Symposium on the Prognosis and Treatment of Dementia Precox at the meeting of the American Medico-Psychological Association, which was held at Boston. During this discussion I made the following remarks:

"Little is to be said about treatment, unless it may be suggested that a careful study of school children should regularly be made by those who are familiar with the disease and understand the gravity of the situation. Surely if ever the advisability of early treatment of disease is indicated, it is in dementia precox. Consultation with intelligent teachers would generally bring to surface those weaklings whose future is threatened by the development of dementia. Treatment might then be possible, and in many instances psychotherapeutics and other treatment of value suggested. It is not going beyond the truth to say that most of our public school systems are the very worst possible for the care and development of the D. P. classes. It would be better for the State, the weaklings and all concerned, if these children could be recognized early, and intelligent effort made to steer them clear of the dreadful fate that ordinarily stares them in the face. Possibly, in spite of any means taken, a large proportion of these classes would run to the terminal stages, but certainly the effort to avert this result should be made intelligently and persistently."

These remarks must be the text from which I shall speak very briefly to-day.

When an alienist has been in harness for a few years he learns, among other things, that the admissions to hospitals for insane contain a large proportion of young people, who have already reached the incurable stages of disease. Ordinarily, they will go from bad to worse, sinking into a condition of mental torpor that ranks them as ciphers, as far as the world is concerned. Under careful treatment a small percentage improve, and lead lives of limited usefulness, as long as preserved from over-strain, and a few are said to recover. I make the remark "said to recover" because my own experience has led me to believe that complete recovery is so rare that it can scarcely be said to occur. Now, what is dementia precox—in other words, precocious dementia? If we limit its definition carefully, we find that it is a form of mental disease appearing generally at the first developmental crisis, rapidly running a course culminating in dementia, as characterized by apathy, indifference, negativism, irrelevance and inability to make continued mental effort. These wrecks are the most striking evidences and proofs of what a bad heredity will do for those who are cursed with it, and who try to endure the strain imposed upon the organism by civilization. If it were the truth, that as nature weeded out the weaklings, gradually, dementia precox was disappearing, there would be little reason for calling attention to the present state of affairs. Unfortunately, civilization and culture are not always under the control of the best of nature's laws, and certain conditions of society are decidedly artificial. We do not yet understand the best methods of brain development, nor have we learned to recognize all of the danger signals of over-strain.

The methods of making mental and physical analyses employed by the modern alienist are so exact, so painstaking, so plodding and so different from the delightful, "jump-at-conclusion" ways of many of his predecessors that it will not be long before he will be in a position to offer suggestions of immense value to the whole world. Perhaps we have too little patience with the so-called theoretical psychology, much of which is attractive, but not founded on fact; but, at all events, the day is not far distant when the theoretical psychologist will be forced to correlate his theories with the facts of psychiatry before he dare offer his wares to the admiring public. Experiences in abnormal psychology make plain the truths of the normal, and allow us to fix the standard, not for a class, but for the *individual,* something that the theorist nearly always overlooks.

It is here that public school systems fail so frequently; they are constructed, as no doubt they must be, to a very great extent with regard to classes rather than individuals. Now to idealize on what public schools might be is seductive; but I am here merely to discuss, from my standpoint, a practical problem that must some time or another be faced.

In making an analysis of a mental case, we commence with the history from the time of birth, and, if possible, go back as many generations as authentic history will give us an account of. The whole development of the child is scanned as closely as it can be done, and rarely indeed in cases of dementia precox is the history without a hundred significant warnings of the tragedy to come—warnings so clear to those familiar with the ear marks of this protean disease that no competent observer could have overlooked them.

When I turn to my own school days and read the histories of the pupils, I stand aghast at the tragedies which occurred, and which possibly might have been averted had the teachers recognized the drifting of several frail barks to their inevitable doom beneath the Niagara of dementia.

These children did their best to stem the current, but no helping hand was stretched to save them from their doom, and their fate was never in doubt for one moment. The wrecks are now scattered about in various institutions for the insane.

The position occupied by such children in the school was somewhat striking—none were *average* in any sense of the word, but at once attracted attention by their departures from what might be called the normal. In some, mannerisms were clearly becoming apparent, the ego undergoing hypertrophy, and emotional disturbances making themselves manifest. Apathy and indifference were the characteristics in others, and those of the paranoid variety were introspective to a degree that brought upon them the accusation of stupidity. In every instance the true mental status was not suspected by the teacher, although some of the other pupils had formed shrewd guesses regarding the mental defect of their companions.

Let me detail very briefly one or two striking examples:

J. C. was a boy of bad heredity, and at an early age showed striking abnormalities in the way of sexual perversions. At school he did well until about thirteen or fourteen; indeed, in certain directions showed unusual ability, especially in mathematics. Then a gradual change took place; he became quiet, neglected work, and was the butt of the school. Teachers lost patience with him, but he showed absolute indifference to the many punishments which came in his direction. He startled the class now and again by flashes of brilliancy which were quite unlooked-for, but at once relapsed into indifference again. The jeers of his companions were taken in good part and without resentment, and among the pupils he acquired the reputation of being a good-natured fool.

He succeeded in mustering up enough energy to make a poor pass at a matriculation exam., and became the *bete noir* of a professor, who was exasperated beyond measure at the stupidity of his pupil, and yet from time to time the whole class was electrified by spasmodic exhibitions of an ability that might, if gone on with, have left all of the other pupils in the rear. The case came before my attention, and from what I learned, without seeing the lad, the development of dementia paranoides was suspected.

A few weeks after this time the boy made what was supposed to be a most determined effort to commit suicide, and I was called upon to give an opinion on the mental status. The patient spoke to me freely and without hesitation, and the story told was a pathetic one. He had been fully alive to the false estimates made by his teachers, but had been so interested in watching, as he believed, the development of a new brain, that he had no time to worry over the trivialities of school life. "They called me stupid," he said, "but if I had cared to exert myself I could have passed them all."

A mysterious voice had been directing him, and he had been told by it that he had the same power as Christ, and his belief in that power had led to his making the so-called attempt at suicide. He reached complete dementia in a few months, and died in a year or so.

Here is a brief history of a case of the hebephrenic variety:

C. S. was always an eccentric child; even in the earliest days at school she attracted attention by her mannerisms and vanity. When she was ten or twelve her mannerisms were a common subject of remark. She walked with a silly strut; her hair was arranged in a manner so grotesque that it was always a subject of comment, particularly on the part of the village gossips, who saw evidences of the degeneracy of the modern days in this so-called new style. Even her voice, as is so often the case in D. P., gave evidence of the abnormal. This poor girl endeavored to stand the pace set at school, but in vain. By and bye the village gossips had more than enough material to keep their tongues wagging. Poor C. S. began to give evidences of what they called "dreadful wickedness"—what I was able to classify as well-defined mental defect.

She was removed to a hospital for the insane, and reached complete dementia almost at once. To see her now, after many years, a mere lump of hideous clay, is object-lesson enough to inspire many a plea, far more eloquent than this, in favor of more careful study of school children, in search of the weaklings who may be helped.

Perhaps I should have said that I am not one of those who believe that our school systems are so developed that they cause over-strain in the average child. On the contrary, my impression is that the majority of children are capable of acquiring with ease and benefit, much more than is given them, and I strongly believe in the proper development of the brain, an organ that is of far greater importance than any other in the human economy. I merely maintain, that without an intelligent study of the individual, it is not possible to avoid the tragedies the alienist is called on every day to witness. With all respect to those who have evolved our educational systems, enough attention has not been paid to the training of teachers, who should be given broader ideas, and more thorough knowledge of the requirements of actual life, and have some conception of the dangers of over-strain in abnormal and diseased children. The education of the masses is, of course, a laudable ambition on the part of any nation, but no greater error can be made than to attempt to make finished scholars of poor weaklings whose sole chance of a useful life lies in carefully guarding them from every species of mental strain.

Paton says: "The first duty of the educator should be to determine the latent capacity of the individual, and then adopt the training, as far as possible to meet the needs of the developing nervous system. To render it possible for an individual who is physically and mentally unfitted for the stress associated with the effort to undertake the acquirement of what is termed a liberal education, should be regarded as an offence against the public health and morality, no less culpable than if one were to place lives in an environment where they are exposed to an infectious disease."

Efforts to control the spread of exanthematous diseases are regarded as a necessity by all but a few faddists, and so sound is the common sense of the community in the control of such matters that we have become almost socialistic in some lines.

How different, though, when questions of sound mental health come up, and yet six or seven thousand chronic insane in the hospitals in Ontario testify to the fact that there is something wrong in our methods. Remember that fifteen per cent., some say twice that proportion, are cases of dementia precox, and the significance of my contention may be grasped. Consider that the first evidence of the coming mental breakdown were to be seen during the school days of these children, and the importance of the whole subject must at once strike you.

Now in my many years of experience it has been my lot to see a large number of children who were abnormal and diseased, and I have been surprised how little intelligent notice has been taken by teachers of their developing defects. In the majority of instances they have been regarded as nuisances; blamed and punished for their stupidity and apathy, and in every way possible made to suffer for so-called sins, for which they were in no way responsible. Often the whole class is made to mark time for one or two weaklings, who should be weeded out. This has been an aggravation to teachers whose reputation depends far too frequently on the number of pupils who "pass", rather than on the solidity of the work taught.

I have no fault to find with the average teacher: as a rule he is far more sinned against than sinning. My contention is merely for a more careful study of the individual pupil in the interest of the State and of everybody concerned.

How is this to be accomplished? At present I believe teachers are supposed to acquire some knowledge of normal psychology—delightful theory, but too often theory founded on arm chair speculation that would work out splendidly if we had to deal with standardized human beings. Those of us who study abnormal psychology soon realize that in our investigations the *individual* is the basis of study, and methods of treatment must be directed from that point of view. Now, no one expects teachers to have a knowledge of psychiatry or of psycho-therapeutics, and no one can expect them to decide off-hand on the proper course to be followed in the treatment of abnormal and diseased children, but I think it importaant that they should know something of the facts I have detailed to-day, and to report anw suspicions they may have regarding the development of such conditions in any of the pupils. It is difficult to say just how the State must deal with the problem, which is even more difficult to handle than that of vaccination, because of the want of special knowledge, both on the part of the public and the physician in general practice. This physician has little or no opportunity to see much of mental defect and disease, and is apt to overlook even some of the most striking appearances. However, the problem must be met in due course, and its importance has already been recognized in some of the Continental cities. What, I suppose, will eventually be done is to have teachers co-operate with physicians who are familiar with mental disease in all of its stages, and the proper course mapped out for the individual who is not equal to the strain of public school work.

In one direction this will, perhaps, entail immense cost to the State; in another a marked saving.

EDITORIAL

A GERMAN CRUSADE AGAINST INFANTILE MORTALITY.

The Germans in their characteristically thorough way are making important strides in the attempt to limit infantile mortality. According to recent reports taken from our esteemed contemporary the *British Medical Journal,* the German Committee formed to further the establishment of a central institution for the prevention of infant mortality in the German Empire met recently within the precincts of the Reichstag. Among those present were representatives of all the provinces and most of the cities of the Empire. Dr. Schoenstedt, who took the chair, delivered an address, in which he gave an account of the scheme and the progress that had so far been made towards its realization. The town of Charlottenburg has given a site of 12,500 square meters, but it has been found that this will be inadequate for the purpose in view, and more ground will have to be purchased. The institution is to be called by the name of the Empress Augusta Victoria. A sum of 950,000 marks has already been contributed, but it is estimated that from four to five millions will be required. The statutes of foundation were adopted. The chief architects are Professor Messel and Herr Hoffmann, and the latter exhibited plans of the buildings. Dr. Keller of Breslau explained the objects of the institution. These consist in the scientific study of questions relating to the nourishment and care of nurslings and the care of the mothers and the promotion of necessary reforms in these matters. We learn from a paper by Dr. Esser, in the *Muenchener medizinische Wochenschrift,* that in Bonn an institution has been established for giving advice and assistance to mothers with regard to the feeding of infants. Every foster infant has to be brought to the institute at least once a month during the first year of life. During the second year the foster mother has to bring the child every second month. Poor mothers can apply for advice and assistance at any time during the first two years of their children's lives. A trained nurse assists by visiting the homes to see that the advice given is acted upon. From February 22nd to October 6th, 1906, Dr. Esser attended on 49 occasions, and was consulted by 89 foster mothers with regard to their charges, by 291 mothers on account of their legitimate infants, and, lastly, by 30 for their illegitimate children. In all, 1,313 consultations took place. Of the 410 infants, 126 were fed by breast, and in 38 the natural feeding was incorrectly carried out, the infants being suckled irregularly or too frequently; five meals a day were held sufficient, but in many cases the mothers could only be persuaded to reduce the number of feeds from ten or twelve to six or seven. Attention was paid also to the diet of the mothers. It was necessary to advise a discontinuance of the nursing in three cases, one of chronic nephritis and two of advanced phthisis. Pecuniary and material help was given to poor women who could not afford to stay at home to nurse their babies. Of 41 women who fed the babies on mixed diet, 11 cases were persuaded to leave off giving any other food than breast milk. The cause assigned for giving the mixed diet was generally that the child would not suck properly and the milk was insufficient, whereas in reality the infants were overfed. In the 30 other cases social difficulties or limited mammary secretion rendered it necessary to add to the natural diet of the infants in a large proportion. Of the 243 infants fed altogether artificially, obvious errors were made, especially overfeeding; it was not uncommon to find women who considered that a weakly child should drink from 1½ to 2 liters of milk in twenty-four hours. Esser proposes to get students to attend the consultations that they may learn how to give practical advice to mothers, and to give demonstrations to midwives. An infants' milk kitchen has been founded in connection with the institute, and in it unimpeachable milk, mixed according to the requirements of each case, sterilized, and ready for use, is supplied, on a medical prescription, free to the women attending, and on payment to persons who can afford to pay. He is very gratified with the results of his endeavors during the short time he has been able to administrate the institute. H. Doerfler in the same issue of the *Muenchener medizinische Wochenschrift* states that in Weissenburg (Bavaria) nearly one-third of the infants died within the first year of life during the last ten years, 70 per cent. of the deaths being due to gastro-intestinal disturbances. He found it impossible to determine the frequency of breast feeding, but estimates it at less than 26 per cent. of all cases. An institute for the care of infants was inaugurated on July 26th, 1906; the two principles on which its regulations were framed were instruction and assistance with regard to nursing infants at the breast and the supply of an unimpeachable milk. A sister attached to the institute is required to visit every patient within twenty-four hours of delivery to persuade the mothers to nurse their babies. A prize of 10 marks is offered to each mother who nurses her baby and brings it up to the institute every fortnight for two months and 15 marks for three months. Every midwife is given 6d. for each woman she has attended during a confinement if the mother suckles her little one. In its annual report the institute publishes a list of midwives giving the percentage of suckled babies which each has delivered. Every medical man belonging to the local medical society has agreed to hold free consultations in turn and to give advice to mothers with regard to nursing, and, when necessary, to artificial feeding. Rules have been drawn up and arrangements have been made for a reliable supply of milk to be distributed when required.

ABSTRACTS

Hysteria in Children.—D'Orsay Hecht (Journ. A. M. A., Feb. 23) says that hysteria in children has not received the attention it deserves and that its frequency is underestimated. He does not attribute it especially to defective modern methods of education or to a luxurious civilization, since statistics show that it is not confined to those who are specially liable to be affected by such, but is found as often in the children of the poor and ignorant as in those of the rich, and that the major types are recruited more from isolated rural districts than from urban centers. Though too much reverence has perhaps been given to heredity in its etiology, the potential force of direct transmission, he states, must be admitted without reserve. The facts of preceding temporary traumatism in some cases and the impressibility and imitative tendency of children must also be borne in mind. It is useless to look for all the so-called stimata and accidents of adult hysteria in the child; juvenile hysteria in its objective manifestations is chiefly monosymptomatic, and a single hysterical symptom, standing out in bold relief in the child should, from its very prominence, arouse suspicion as to its functional nature. Motor symptoms prevail; sensory symptoms, according to Hecht, are rarely noted in children, and when they are, are usually of the hyperesthetic type. When an anesthetic zone, suggested or not, appears, it is of the same sharply demarcated, unanatomic type as in adults. Hysterical motor agitation shows itself largely in the form of choreic movements, a variety of facial spasms, convulsive tics and epileptoid seizures. The graver forms of the latter are frequently mistaken for epilepsy, and those of somewhat lesser degree are conveniently evaded with a diagnosis of hystero-epilepsy, a practice to which Hecht objects. As regards diagnosis, Hecht favors the Möbius dictum in dubious cases that "such symptoms may be regarded as hysterical, which can not be voluntarily produced or which may be simulated." The greatest difficulty is often not so much to avoid mistaking organic disease for hysteria and vice versa, as in failing to appreciate that organic disease may, and frequently does, complicate hysteria. We should study the child's temperament, remember its imitative faculty and in all conditions with a prominence of doubtful symptoms, think of hysteria as a not impossible factor. The prognosis is infinitely better than in adults, and as a rule, the younger the child the better. The fundamental law of treatment is that all hysteric symptoms are psychic, and the means of cure can only be psychic, *i.e.*, acting on and through the patient's mind. An early and positive diagnosis favors an early and complete cure. Isolation is imperative when the cordial and efficient co-operation of friends and parents can not be had. After a cure in isolation has been secured the patients should not be returned too soon to their former associations. Hecht refers with some little detail to Bruns' methods of treatment of these cases, the "method of surprise" and the "method of disregard" and considers the objections that have been made to them rather weak. Unpleasant and even slightly painful methods applied with due judgment may be successful because of these qualities in properly selected cases.

Volkman's Ischemic Paralysis and Contracture.—C. A. Powers (Journ. A. M. A., Har. 2) reports a case of this condition in a boy of 17, following a stab wound in the right forearm, and discusses the literature, analyzing the reported cases. The condition is essentially a myositis and is quite different from that following the use of Esmarch's bandage. The characteristic features of both are described. It is usually the result of overtight bandaging in fracture cases, and is most common in children, and in the upper extremity. The prognosis is not very good for complete recovery, though a fair result was obtained in a little over half of the cases, and it seems better in patients operated on by tendon lengthening, bone resection, etc., than in others. It begins soon after the use of the splint, with progressively increasing pain, and if the splint is not speedily removed, contractures and paralysis follow. The removal of the cause must be within four or five hours to secure recovery. Primary lesions of the nerves may also exist. The diagnosis is clear, with a history of the case. The English authorities advise massage and passive motion in the slighter cases, continued over a long period if necessary.

Is Scarlet Fever a Streptococcus Disease.—From a study of the facts of scarlet fever (Journ. A.M.A., Apr. 6), L. Hektoen, Chicago, thinks that we are justified in concluding: (1) That the predominant feature of the bacteriology of the throat in scarlet fever is the constant presence of large numbers of Streptococcus pyogenes; (2) that the overwhelming majority of the so-called complications and of the deaths in scarlet fever are due to an invasion of the tissues and the blood by this germ; and (3) that in scarlet fever, even when mild, the organism gives evidence of systemic reaction to streptococci by variations in the streptococco-opsonic index and probably also by the formation of streptococco-agglutinins. In spite of all this and of the fact that many of the essential symptoms of scarlet fever can be explained by what we know of the pathogenic powers of the streptococcus, there are serious difficulties in accepting the streptococcal theory of the disorder. There is no analogy in known streptococcus infections with the lasting immunity conferred by even mild cases of scarlatina; there is the reported lack of evidence of streptococcic invasion in certain fulminating cases of scarlet fever; streptococci are scarce in the skin in this disease, notwithstanding the generally accepted infectiousness of the skin lesions; the longevity of the scarlatinal virus, of which there are many recorded instances, is contrary to anything known of the streptococcus. The view, therefore, that the germ of scarlatina is yet unknown and that the streptococcus is a concomitant or secondary invader, seems to Hektoen to harmonize better with the facts. We may infer that the throat conditions in scarlet fever are particularly favorable to the Streptococcus pyogenes, and the chief significance of the pure scarlatinal virus would seem to be to open the door, so to speak, to streptococci. The need for potent antistreptococcus remedies is as urgent as if it were a purely streptococcus disease. Especially in view of the fact that streptococci grow in virulence in the susceptible animal organism, it is our duty to guard against the transfer of especial virulent strains from patient to patient, by insuring adequate measures of isolation.

Summer Diarrhea in Infancy.—MYERS (Medical Record, June 2, 1906) declares that the only correct means of ever classifying summer diarrhea will be from bacteriological examinations of the stools. The infectious origin of this disease is the theory held by many authorities. Bad hygienic surroundings predispose to this disorder. The already weakened mucous membrane is inflamed by undigested food which acts as a foreign body. The most susceptible period in the child's life appears to be from the fourth to the twentieth month. Artificially-fed infants are more frequently attacked than the breast-fed. The writer believes that the greatest factor in the production of this disease is the feeding of infants upon cow's milk which has been brought from a distance in warm weather and kept in hot cans before being prepared for feedings. The symptoms of this disease generally abate in from a week to ten days. The milder cases are the more frequent.

In respect to treatment the writer, among other suggestions, gives the following. A daily warm sponge bath should be given; the greatest care should be taken to keep the feeding utensils and the food absolutely clean; feeding should always be given warm, at a temperature of 100 deg. F.; the napkins should be removed and disinfected as soon as soiled;

the child should have plenty of fresh air and light clothing; diarrheal cases should be isolated.

The Digestion of Cow's Milk Proteids by Infants.—According to F. X. Walls, Chicago (Journ. A. M. A., Apr. 27), the proteids of cow's milk give rise to no digestive or nutritive disturbances in young infants, and the theories now prevalent as regards the artificial feeding of infants will have to be modified. The notion of proteid indigestibility has been based on some crude test-tube experiments and the misappreciation of certain appearances in the baby's stools. The common whitish or yellowish lumps in infant stools—the so-called curds—are not proteid material, he asserts, but fats or fatty soaps, rarely are they inspissated mucus or clumps of bacteria. In hundreds of cases in which he has given fat-free undiluted milk to infants he has never after careful examination found curds in the stools. He reports two cases of infants suffering from enterocolitis fed on centrifugalized fat-free milk without any digestive disturbance and with excellent therapeutic effect. He says that there is no symptom or group of symptoms from which we can conclude that there is any injury to the infants from the albuminoid material in cow's milk, and this being shown, all the methods advocated to assist in the digestion of the proteid are without foundation and may be harmful. This does not mean that we are to feed babies on a fat-free or skim-milk diet. The normal child demands a proportion of fat in its food and this is a matter for individual determination. An excessive amount of fat, as shown by Brenneman, is the most frequent source of over-feeding, and the most dangerous foods are the cream mixtures. For a normal infant Walls would advise a a dilution of one part whole milk and two parts water, gradually decreasing the dilution till in six months or a year, whole milk is reached, and such whole milk containing not to exceed 2 or 3 per cent. of fat. Feeding, after the first week, should not be oftener than once in four hours in the daytime and twice at night, and the amount should be enough to satisfy the infant's appetite. The caloric value of the food taken during the twenty-four hours should be estimated as a check against over feeding, though as a rule babies fed not over once in four hours are not likely to overfeed. The author's conclusions are given substantially as follows: 1. There is no evidence that the proteid of cow's milk causes any digestive disturbance in the infant. 2. All experiments prove that cow's proteid is easily digested and resists putrefaction. 3. The method of proteid modification as aids to digestion are therefore erroneous. 4. In sterile, fat-free milk we have an unequalled therapeutic agent in the treatment of the nutritive disorders of infancy.

Tuberculous Meningitis.—H. KOPLIK, New York (Journ. A. M. A., Apr. 6), gives an analysis of 52 cases of tuberculous meningitis occurring in his hospital practice during the last six years. All the cases utilized in his article were diagnosed clinically and the diagnosis confirmed by post mortem, lumbar puncture or animal experimentation. The oldest patient was ten years, the youngest six months, the average four years and four months. The onset, in cases in which reliable data could be obtained was generally insidious, and Koplik is inclined to question the majority of the reports of sudden onset in this disease. Rigidity was absent in fourteen (27 per cent.); hyperesthesia was lacking in the great majority (90 per cent.), the patient generally lying dull and giving little attention to surroundings and reacting slowly to irritation. The Kernig symptom was present only in twenty-two cases, and he considers it of comparatively slight diagnostic value. The Babinski reflex, on the other hand, is, he thinks, a more valuable evidence of the tuberculous nature of the disease, as it is exceptional in the cerebrospinal type. Skin eruptions, the *tache cerebrale,* the character of the pulse and of the respiration have not much value for the diagnosis; vomiting occurs when the ventricles are distended, but is not a leading feature or persistent. Temperature is important; the absence of fever, or persistently low temperature with the cerebral symptoms is strong evidence of tuberculous meningitis. Very high temperature means either a complication or approaching death. Localized pareses only appear toward the close of the disease and then their evanescent character is characteristic. While leucopenia is a presumptive evidence of a tuberculous process the leucocyte count furnishes nothing pathognomonic in this form of meningitis. The eyes of all the patients were examined by experts and some change, varying from optic neuritis to chorioidal tubercle was found present from the beginning in 66 per cent. This symptom sharply distinguishes this form from other types of meningitis, especially the cerebrospinal, in which fundal changes are rare. Skull percussion is of the greatest value in the early stages of the disorder when the symptoms are still rather equivocal. McEwen's method should be followed; the patient is in an upright position, the head slightly inclined and percussed over the pterion. Koplik found this of value in 34 of his 52 cases. Lumbar puncture, while admittedly the most valuable precise diagnostic method, is advised only as a confirmatory method after the clinical examination has rendered the presence of tuberculous meningitis highly probable. In other words, Koplik would use it only as a means of confirming or excluding the presence of a disease whose prognosis is hopeless. He believes that careful search will reveal tubercle bacilli by this method in a majority of cases. Although a lymphocytosis of the puncture fluid is not pathognomonic a predominance of lymphocytes is of considerable significance and certainly excludes the diagnosis of certain acute purulent forms of meningitis. Summing up the diagnostic points the author says that the diagnosis of tuberculous meningitis in its earlier stages is possible to-day, whereas it was well nigh impossible formerly. The slow onset interrupted by periods of irritability, etc., the irregularity of the pulse and respiration, the low or normal temperature, the absence of hyperesthesia, the lack of appetite, and the discovery of hydrocephalus by percussion of the skull will all tend to establish the diagnosis. If after this we can obtain a lumbar puncture, the examination of the fluid in the great majority of cases will put the diagnosis beyond a doubt. The examination of the fundus of the eye is also conclusive in many cases.

On the Clothing of Infants.—O'Followell (Annals d'Hygiene.) Reviewing the history of the clothing of babies through all time, the author points out how for centuries the mistake has been in hampering movements of limbs, chest, and abdomen by various devices of swaddling-clothes. The effect on the development of the child is not the only evil of this method, for, as Dr. O'Followell points out, the actual process of clothing the child cannot do it any good, being turned about in all sorts of ways: first on its back, then on its face, then on its side, back on to its face, then on its back, etc., whilst the different articles of clothing are severally adjusted.

Further, pins, seams and buttons frequently press on undesirable places, causing pain and discomfort to the baby.

Whilst visiting the English hospitals last year during the visit of the French doctors, he was introduced to the Alione method of clothing infants, and he strongly advocates its general adoption.

The method essentially consists in combining the various articles of clothing so that the baby is laid on the clothes on its back, remaining in this position throughout the process of clothing. The clothes are fastened at the side by means of tapes—no pins or buttons being used. In this method the baby can be completely clothed without having been turned over a single time, all fastenings are away from points of pressure, and the fact that no pins at all are used does away with any danger or possibility of irritation from that source. The result is a a perfectly secure, loose, and warm clothing for the infant without any of the drawbacks so common to usual method of clothing them.

Mouth Breathing, Its Causes, Effects and Correction.—C. M. Sandusky says that mouth breathing if long continued produces serious effects on the general health. Children so addicted should be corrected early. If such attention is not given promptly it may result in an entire change in the contour and expression of the face. The continued abnormal respiration shortens and broadens the nose by the drawing down of the muscles of the face. The bones of the face being soft and easily moulded the same pressure draws in the upper jaw and instead of the palate being a smooth round dome there is formed a high irregular arch. Where the floor of the nose is thin from imperfect breathing in early childhood the terminal nerve filaments going to the roots of the teeth run a superficial course. Should an inflammatory process be set up for instance from a septal spur or any cause it may result in devitalization of the teeth and abscesses. Frontal headache and facial neuralgias are often met with. Among the many deleterious results from imperfect breathing the changes in the blood is a prominent one. There is also an intimate relationship with nasal obstructions and diseases of the eye and its appendages. Interference with the outlet of the nasal duct results in a reversal of the flow and the introduction of septic material within the conjunctival sac. Thus the nose may be a large etiological factor in epiphora, trachoma, conjunctivitis anad corneal ulcers, and dacro-cystitis. The fetid odor of the breath is due to altered chemical action and decomposition of the saliva. Such altered chemistry of the saliva may form compounds which when swallowed form no small part in detracting from the general welfare of the body. The causes of mouth breathing are: Collapse of nasal alæ and narrowing of the nostril; occupation; various neoplasms of the nose as polypi, fibroma, etc.; adenoids; enlarged faucial tonsils; acute rhinitis and the several manifestations of the chronic form of the disease.

Influence of the Mother's Health on the Fetus.—J. W. Ballantyne, Edinburgh, Scotland (Journ. A. M. A., Apr. 27), holds that any diseased condition of the mother during pregnancy, whether due to microbes; toxins, toxic agencies or diathesis, has its dangers for the unborn child, and the fact that it so often escapes must be explained by the protective influence of the placenta. The morbid influence may either force its way through the placenta and cause disease of the fetus, or it may cause its death by destroying the integrity of the placenta itself. The laws governing the placental interchanges, however, have not been discovered. The great safeguard of the fetus in case the mother is diseased, is a healthy placenta, which prevents the passage of germs and toxins and is not itself affected by them. We do not know yet whether there are medicines that act as placental tonics as it were; possibly potassium chlorate and mercury, or some of the organic extracts may be found to have this action. The placenta is a very vital organ of the fetus and this is probably one of the chief reasons why disorders such as maternal syphilis, which causes marked lesions in the placenta, have such disastrous effects on antenatal life.

Pneumonia in Children. Its Successful Management by Hydriatric Measures.—WORSTER (Med. Rec., Feb. 16., 1907) gives the detailed treatment of pneumonia in children with cold baths, illustrating the same with the records of a case. The good effect of this treatment, he explains by the cold applied to the peripheral nerve producing a shock which is conveyed to the central nervous system. This, in turn, sends out reflex stimulus to the nerve centers which govern respiration, circulation, digestion, tissue building and excretion. He says the mere lowering of the temperature is a secondary consideration. The temperature, however, is reduced, respiration deepened, cardiac action improved, and the pulse slowed and rendered less dicrotic. His method is as follows: In the early stages of pneumonia full baths, beginning when a temperature of 102.5 degrees is reached, are given every four hours. The temperature of the first bath is 95 degrees. This is lowered two degrees for each bath until it reaches 80 degrees. The temperature of the bath should not be reduced below 80 degrees, and the effects should be closely watched. During the bath vigorous friction of the body should be applied. If dyspnea, somnolence, stupor and delirium occur the child is held in water at 100 degrees enough to cover its hips for five minutes; then several basins of water at 70 degrees having been prepared and in readiness, are poured upon its shoulders. This can be repeated every two hours if necessary. This procedure is called "affusion," and should be used when any head symptoms make their appearance. Each bath generally reduces the temperature two degrees, and though it rises again, it is generally not so high. The baths are repeated until the temperature is finally reduced to normal and remains there. His report on this method of treatment is very favorable.

Infantile Atrophy of Intestinal Origin.—D. L. EDSALL (Journ. A. M. A., May 4), discusses the pathogenesis of infantile intestinal atrophy and offers the theory that it is the result of disorder of the ferment function of the intestine. That is, when the proteid of the ingested food is progressing in the breaking down or fragmentation necessary for its reconstruction into homologous form, the final attack by the ferment of the intestine does not occur or is ineffectual, and the rebuilding into the patient's tissues fails or is imperfect, hence the atrophy. The foreign protein may be either incompletely fragmented and the reconstruction therefore rendered impossible to the extent of producing a homologous protein, or the intestinal ferment failing or being reduced, reconstruction would also fail. This hypothesis is consistent with the fact that the difficulty lies in the utilization of the milk of a foreign species. There is no good evidence, he declares, that infants ever fail to assimilate human milk unless they are desperately ill, provided that the milk is not so rich as to upset digestion or so poor as to be insufficient; and provided also that the mother or nurse is not in such a physical or emotional state as to render the milk unsuitable. He has tested his hypothesis by studies of the proteolytic power of the intestines obtained at autopsy in three cases of children dying of typical progressive atrophy; also in three control cases of persons dead with extreme emaciation due to other causes, and also in two cases of older persons with continuous and final extreme emaciation for which the autopsy showed no cause. His method of investigation is given in detail, and the results in the cases of infantile atrophy appear to support his theory, inasmuch as they show a great reduction or entire loss of proteolytic power in the intestinal mucous membrane. The control cases show a much greater proteolytic power. The two older patients were stuporous and were fed by the stomach tube. In both, the intestinal extract showed no proteolytic action, but, contrary to the infantile atrophies, the extract of the gastric mucosa showed little, if any, evidence of the presence of pepsin. The suggestion of Pawlow that in such cases the lack of psychic stimulus to the production of digestive ferments may play a part, is referred to, and Edsall thinks that here also there is a field for study.

Buttermilk as Infants' Food.—DRS. SALGE and HEUBNER report that after extensive tests their experience has confirmed the assertions of the Dutch physicians in regard to the way in which healthy and sick infants thrive on buttermilk. It must be less than twenty-four hours old, made from sour cream, mixed with sugar and flour, and brought to a boil three times. The stools are very fine but scanty. The weight shows a regular upward curve. Salge found it especially beneficial as the first food after dyspepsia and acute intestinal disturbances, in atrophy, and for supplementing nursing.

Convulsions in Children.—MOON (Lancet, Sept. 15, '06) is of the opinion that convulsions in infancy, associated with reflex causes, have a much more serious prognostic significance than is usually supposed, not only as regards the frequency of the convulsions, but still more as to the probability of future mental and moral deterioration. In 200 cases taken haphazard, carefully investigated and followed up, the prognosis as to the future moral and mental condition of the child does not appear to be any better when the first seizure is associated with a reflex cause which can be removed than when it is of idiopathic origin.

Cerebral Syphilis in Childhood.—A. W. Fairbanks (Journ. A. M. A., Mar. 9-16) uses this designation of his subject, as possibly many cases of syphilis developing late in childhood are acquired, rather than hereditary. Hereditary syphilis, he states, is deserving of much more attention than it has received. The three principal pathologic conditions of cerebral syphilis are in the order of their apparent frequency of occurrence: Meningitis (principally leptomeningitis); arteritis (usually endoarteritis); and syphilomata (usually of meningeal origin). All other changes are probably secondary to these. The characteristic symptoms of syphilitic lesions are their multiformity, their usually subacute onset with occasional acute and severe individual symptoms. These latter often disappear unexpectedly and recur in the same or other localities, eventually becoming permanent. Lastly there is the striking amenability of some of the symptoms to specific treatment, while others are most resistant. The symptoms are manifold, but some one type usually predominates at some period of the disorder. Psychic changes occur early, but are often unobserved and lacking in the history. Other symptoms, motor and sensory, make their appearance before the psychic changes are fully recognized, such as vertigo, frequent speech aberrations, visual disturbances and attacks of syncope. Later pupillary phenomena, epileptiform or hemoplegic attacks appear. Early recognition of the condition is very important and evidence of hereditary syphilis in the family history should be diligently sought. The prognosis depends largely on the pathologic type, the determination of which is not always easy. The purely gummatous symptoms are usually amenable to specific treatment and simple meningeal conditions are also commonly favorable, while arterial lesions are the worst. External injury often precedes the outbreak and is considered the cause. While the author does not think this commonly the case he admits the possibility that the impaired brain may be a point of least resistance.

Diffuse Peritonitis following Appendicitis in Children.—Smith (Boston Med. and Surg. Journ., Mar. 28) reports seven cases of diffuse peritonitis, following appendicitis, occurring in children, from 3 to 8 years of age, a study of which convinces him that appendicitis in children exhibits certain features not altogether common in adults. Four of these children died. The most striking feature in all of these seven cases was the fact that the pathologic conditions found at operation were out of all proportion to the duration of the illness. In three of the cases, the peritonitis was so extensive as apparently to involve the entire greater cavity, with an average duration of less than 48 hours from the appearance of the initial symptoms. It was a noticeable fact that in five of the cases the perforation in the appendix was large, that is, as great in diameter as a split pea.

The Significance of Albumin and Casts in the Urine of Children.—Frederic E. Sondern (Archives of Pediatrics, Feb., 1907) notes the frequency of albumen and casts in the urine from conditions outside of the kidney. They do not necessarily indicate an organic lesion of the kidney, but a functional disturbance due to the failure of other organs to perform their duties perfectly. "While the evidences presented by the urine in decided acute nephritis, and in many cases of chronic nephritis are never simulated by those appearing in consequence of functional and non-inflammatory renal disturbances, still the differentiation between the latter and a mild or quiescent nephritis is very often not possible on the basis of albumin and casts. Sudden changes of temperature, cold baths, violent exercise, sudden changes in attitude, fright, extreme grief, surgical or traumatic shock, not limited to the kidney; anything that suddenly increases or lowers blood pressure, and a host of other causes may be named for the transitory albuminuria, due to changes in circulation or enervation. In these changes the diagnosis is simple, on account of the short duration of the condition in question and the easy detection of the causative factor in the clinical history. When the functional albuminuria is, however, due to changes in the composition of the blood offered the kidney for the exercise of its function, or to circulatory disturbances due to lesions of the heart or other organs, the condition is not transitory in the same sense, and these are the cases in which the differential diagnosis between functional and nephritic albuminuria becomes much more difficult. In them the mere consideration of albumin and casts is not sufficient, and repeated complete analytical results, combined with careful clinical observation, are always necessary, and not invariably successful at that." Faulty metabolism is cited as having an etiologic relationship particularly to the intestinal form of nephritis. Intestinal autointoxication or toxemia frequently produces a functional albuminuria, which progresses into a true inflammatory nephritis.

A Practical Study of Epilepsy.—W. T. Marrs (The Medical Times, July, 1907). He says that among the causes of this disease is the later theory that lecithin, which is normally present in medullated nerve sheaths in large quantities, undergoes a change by which a toxic property is evolved, and this, when absorbed, is supposed to cause an "explosion." In view of the essential part lecithin is alleged to perform in the construction and function of the nerve cell, neuro-lecithin is said by those who have tested the product, to exert specific action in epilepsy. We hopefully await clinical evidence.

Diagnosis by the Nose.—E. C. Hill, Denver, Col. (N. Y. Med. Journal, July 13, '07.) After describing many different odors he points out that in children much can be learned by the odors of the feces. The odor of the stools of breast-fed infants is normally faintly sour and aromatic, from fatty acids, being slightly foul in constipation, particularly if inanition obtains. The proteid scent is more marked in cow's milk stools. The excavations are sour smelling in the green, acid diarrhea of infants, from fermentation of carbohydrates. The putrid odor of albuminous decomposition pervades the air of the room in the more severe leaden gray pultaceous form of diarrhea. In fatty indigestion the stools have the smell of sour cream or rancid butter. They are like old cheese in putrefaction with failure of fat digestion, as in the celiac affection of young children. In profuse mucous discharges, often accompanied by pus, there is a peculiar odor like wet hay (Selter). In cholera infantum the stools have been described as musty and mousy.

Enuresis and Fecal Incontinence in Children.—G. F. Sili (Clinical Journal, London, Apr. 24, '07). The author insists on the importance of a most careful examination of the urine in every case of enuresis because a clue to the treatment can thus often be obtained. Threadworms are so often the cause that it is wise even when their presence is denied to give one dose of santonin to make sure. He thinks that in the majority of cases belladonna is the remedy indicated, and to obtain the best results it must be given systematically for several weeks. It should be pushed until the enuresis is stopped or the limit of tolerance is reached. The tincture of nux vomica, potassium bromid or phenacetin, and fluid extract of rhus aromatica have proved of value as well as ergot in some cases.

He protests against the tropical application of silver nitrate, the injections of fluids into the spinal canal or elsewhere, and massage of the neck of the bladder.

In the treatment of incontinence of feces he favors Dover powder, grains 1½ to 3, t.i.d., according to age of child, and a mixture of belladonna with potassium bromid to which arsenic and nux vomica may be added. All food likely to irritate the bowel must be prohibited, and all drinks should be given either cold or only just warm.

Symposium on Milk.—William R. Copeland (Pennsylvania Medical Journal, June, '07). Attention is drawn to the possibilities of a great variation in the amount of butter fat in milk, and it is shown by means of tables based on analyses and investigations covering a period of years, that the breed of cow, proper mixing, time of year, the different portions of milking and whether the cow is in heat, are all determining factors in obtaining a milk of uniform butter fat content.

He concludes: (1) Jerseys and Ayreshire cows are the greatest fat producers. (2) There is more fat in milk during the latter six months of the year (4.71 per cent.) than in the first six (3.84 per cent.). (3) That the second half of milking contains more fat (4.23 per cent.) than the first (2.65 per cent.); the last third more (4.55 per cent.) than first third (2.33 per cent.); the last fifth more (4.97 per cent.) than first fifth (1.99 per cent.); the last bottle more (average figures) (6.84 per cent.) than first bottle (0.74 per cent.). (4) A cow in heat produces more fat in the afternoon of the first and morning of the second day. (5) That the variation in number of bacteria per c.c. in milk from individual dairies ranges from 9,350 in "Certified" milk, every possible care being taken, to 270,000 in "Poorest milk and poor facilities," showing that "the number of bacteria is affected by the conditions of cleanliness under which the milk is drawn.

Edward T. Crofutt.

The Milk Supply of Atlanta; the Dangers Existing in Impure Milk, and Its Remedy.—By L. B. Clarke, M.D. (Atlanta Journal-Record of Medicine, June, 1907.) The fearful conditions of the local milk supply obtain not only in Atlanta but in almost all of the smaller cities. The consumers must be educated by the physicians to demand pure milk. The milk dealers are often to blame. Obtaining good milk from the dairies it is contaminated in the handling both at the stations and by the drivers, some of the latter filling unclean bottles collected at one house from the can in the wagon, and selling it to the next customer. Referring to the investigation of some recent epidemics he says: "A few years ago, from the world at large were collected statistics regarding contagious disease, and nearly 350 separate epidemics ascertained to have been spread through the agency of milk. It readily, easily, greedily becomes infected. Of these outbreaks mentioned: 'One hundred and ninety-five epidemics (not cases) were typhoid fever.' 'Ninety-one epidemics were scarlet fever.' 'And the remainder were diphtheria.' Typhoid fever knows no greater agency of spread. Witness the experience in this city last year from the milk supply. Rigid search into the methods of disseminating the diseases enumerated in the outbreaks just mentioned, developed one or other of these causes. (1) The disease existed at the dairy. (2) Milk diluted with infected well water. (3) Cows wading in filthy water. (4) Employees nursing contagious disease at home and continuing to work at the dairy. (5) Employees themselves with disease in mild form and continuing at work. (6) Milk utensils washed with infected cloths. (7) Milk kept in closets in sick rooms. (8) Employees of dairy visiting at infected homes. (9) Refilled cans or bottle from houses of patients. The chief trouble lies in the fact that the questions of surrounding the care of the cows, the milking, and the subsequent care of the milk, with the proper safeguards, have been considered beneath the dignity of the physician's learning, and have been relegated to the dairyman, who has either wilfully neglected, or has been woefully ignorant of the causes and remedies. It devolves upon the doctor to teach."

Diabetes in Children.—Fletcher (Practitioner, July, '07) calls attention to the rarity of this disease in children, but intimates that routine examination of the urine in children might produce larger figures. His records of all cases treated in St. Bartholomew Hospital in 22 years, show the disease to be more frequent between ages of 14-16 years; that heredity must be regarded as an etiological factor, and that shock or overexertion also plays an important part. Polyuria may be present in amounts varying from 3-20 pints per day, with an excretion of from 1,000 to 3,000 grains of sugar. He further comments on the absence of symptoms in some cases until the advent of coma, there having been but slight polyuria and little wasting. Should examine urine of patients suffering from nocturnal incontinence. Intercurrent diseases of but slight import, *per se*, precipitate the termination of the disease. Prognosis is more favorable when acetone and diacetic acid are absent. He particularly calls attention to the chief distinction between the treatment in children and adults, in that a strictly carbohydrate-free diet can rarely if ever be adopted in children without bringing about an increase in the acetone and aceto acetic acid and a great liability to coma. Otherwise he favors similar treatment as for adults, using alkalies for coma, salicylates, codeine and opium.

E. F. Crofutt.

Abdominal Signs of Pulmonary Disease in Children.—Thomas (Amer. Journ. Obst., July, '07) calls attention to the number of cases which at the onset of the disease present a classical symptom complex of appendicitis and which later disappear *pari passu* with the appearance of thoracic signs of pneumonia or pleurisy, and shows that the importance of the differential diagnosis in these cases is evident when we take into consideration the fact that if the abdominal condition is of an infectious or other character it will necessitate an operation, whereas if the lung condition is the one causing the trouble an exactly opposite treatment is necessary and an operation would endanger the life of the patient. He explains the pathology of this condition on the grounds that the reflex is carried through the lower six dorsal nerves, which extend from the thorax on to the abdominal walls, and supply all the muscles of the abdominal walls all the way to the brim of the pelvis, the diaphragm and lower part of the pleura also being supplied by these intercostal nerves. He also states that appendicitis and pneumonia may exist together, and further that reflex symptoms from the lung may cause epigastric pain simulating acute gastric indigestion. He claims that too little attention has been paid to these reflex symptoms and believes that if they were better understood by surgeons there would be more conservative diagnosis made and less haste in operating. E. F. CROFUTT.

VARIOT (La Clinique Infantile, June 15, 1907) writes about the use of leguminous broths, rice water, and fluid diet, in the treatment of diarrheas of children. He opposes the popular belief, also held by some physicians, that decoctions of fresh leguminous fruits have a nutritive value in intestinal derangements. He ridicules Mery's "bouillon" of fresh carrots, potatoes, turnips and dried peas, likewise Comby's bouillon of dried legumens, and shows, from their extremely low content of organic substances, that they can have no appreciable food value. Variot recommends the exclusive use of rice water for twenty-four or forty-eight hours, depending on the gravity of the case and the appearance of the stools. Then to the rice water he carefully adds a third of sterilized milk, then a half, then two-thirds, until he gradually returns to the previous feeding of health. Opium should never be given, on account of its inhibitory action on the digestive tract. He does not recommend irrigation, claiming that the tube injures the intensely congested intestinal mucous membrane. With this extremely simple treatment he has secured brilliant results, his mortality rate being only two per cent. The author believes most of these diarrheas to be "toxi-infections of alimentary origin." H. T. RADIN.

GRECO (La Pediatria, July, May, 1907) contributes the result of his researches on sodium chloride in the urine of children affected with tuberculous peritonitis, and treated with injections of "physiological iodated serum." The retention of sodium chloride is a phenomenon intimately and constantly associated with a morbid state of the organism, and chloruria succeeding such a diseased condition is only the expression of a return to the normal condition. The sodium chloride not eliminated does not remain in the blood, but passes into the interstitial tissues. He summarizes his conclusions from the use of his serum as follows: (1) The "physiological iodated serum" administered hypodermatically acts in diverse ways in tuberculous peritonitis, and more rapidly and beneficially than iodine alone. (2) Iodine hypodermatically increases the activity of the lymphoid organs, while it increases the number of red blood corpuscles and their hemoglobin content. If to the iodine, chloride of sodium is added, this increase will be more manifest and more rapid. (3) The elimination of sodium chloride in the urine rapidly increases with the injection of this iodated serum. (4) By the amount of sodium chloride in the urine, in children affected with tuberculous peritonitis, one is able to determine the gravity of the condition. The steady increase in the amount of the salt eliminated always indicates a progress favorable to a cure. If the amount remains stationary, it indicates that the disease is persisting or is getting worse. H. T. RADIN.

Latent Diphtheria.—SOLIS-COHEN (Journ. A. M. A., July 6, '07) urges increased restricting of ambulatory cases of diphtheria as proven by bacteriological diagnosis, as he believes that the prevalence of diphtheria is due to the lack of control over these latent cases of diphtheria and over so-called "carrier" cases; that diphtheria may occur in a latent form without pseudo-membrane and with only slight symptoms. To properly control these cases he suggests that latent cases of diphtheria be isolated until two successive negative cultures are obtained; that all cases of sore throat should be reported to the health authorities and should be examined bacteriologically; that infected contacts should be excluded from school or work and should not be permitted to frequent public places until two successive cultures have proved negative; that all who have been in contact with a diphtheria patient, whether at home, school, or at work, should be examined bacteriologically and that until this is done and they are found free from diphtheria bacilli, that terminal disinfection of rooms and their contents is not only insufficient, but treacherous, as animate carriers of infection are more dangerous than the inanimate. E. F. CROFUTT.

BOOK REVIEWS

La Coryza Syphilitique: Rhino-Pharyngite purulente septico pgoheimique: Ches Les Nouveau-Nes Syphilitiques. By Paul Gaston. Maloine, Paris.

Coryza, "the earliest and most constant symptom" of syphilis of the new-born, may be the source of a great variety of unfortunate consequences. Directly and indirectly its complications and sequelæ are capable of inestimable mischief. In "Le Coryza Syphilitiques, Dr. Gaston presents a systematic study of this important subject, discussing the pathology, symptoms, diagnosis, complications and treatment. This book is first of all a scientific study, but it is also a very practical little work. A valuable point mentioned in regard to prophylaxis is the importance of disinfecting the vagina of a syphilitic woman immediately before delivery, as the streptococcic infection so often found in connection with these coryzas is undoubtedly derived from the birth canal during labor.

Diagnostic et Traitement des Végétatious Adénoïdes A Study of the Necessity of Radical and Timely Intervention in Adenoid Growth and the Disastrous Consequences of this Affection When Left to Itself). By Dr. Suarez de Mendoza, of Paris, Member of the Opthalmological, Otological, Laryngological and Rhinological Societies of Paris, of the Society of Medicine of Paris, and of the Royal Academy of Barcelona, with a preface by Professor Duplay, member of the Academy of Medicine of Paris. Paris, 1906.

The series of articles by Dr. de Mendoza published in the Special Archives of Medicine and Surgery now appear for the first time together as a separate monograph.

This work, written for practitioners, ought to be called "A Treatise on Adenoid Vegetations," for this very important pathological condition of childhood has been studied with clearness and precision in all its details, and certain chapters, the most important, like symptomatology, diagnosis and treatment, have been dealt with in a masterly way.

The work is constructed on the following plan: in the first chapters the author gives the definition and a historical sketch of adenoid growths; he next passes to the anatomy, normal and pathological, then the etiology.

The following chapter on symptomatology will be most useful to practitioners, being a most complete study of the symptoms in the infant, the adult and the suckling. After having emphasized the relation between adenoid vegetation and infective diseases, especially diphtheria, tuberculosis and broncho-pneumonia, the author gives the points of diagnosis, differential diagnosis and prognosis. The treatment, medical and surgical, with the choice of operative procedure and the instrument, are explained in a particularly clear and forceful manner.

Finally, after a statement of complications, of operation, the author describes the happy results of intervention.

As criticism of the work we cannot do better than to quote the words of Prof. Duplay contained in the preface. "The results of mouth-breathing so disastrous, and unphysiological, due to nasal obstruction by adenoid vegetations, are exposed in forcible detail and with the hand of a master. The author shows what a large number of infants, well endowed in other respects, can be deprived of their health, their intelligence, their memory, their endurance for work. He pictures, in a knowing manner, these poor children, with characteristic facies thin, puny, stunted, prone to all the infectious diseases to which their age is susceptible, and recovering in the great majority of cases as by a miracle when one removes the cause by timely intervention."

The book "ought to be read with the greatest attention, not only by the practitioners whom he had in view in the writing, but also by the specialists, all of whom will certainly glean something useful from it."

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OBSERVATIONS ON TEMPERATURE IN CHILDREN.[1]

By Charles Gilmore Kerley, M.D., N.Y.

Normal Temperature.—The question is often asked: What is the normal temperature of a baby or young child of a given age? In order to answer this question from our own observation, a study of the matter was carried out at my suggestion by Dr. H. G. Myers, resident physician at the New York Infant Asylum. This study comprises fifty-nine cases, the ages varying from birth to one year. Only well children were selected for the observation, the majority being breast-fed. The temperatures in each instance were taken by the rectum for four minutes.

It was found in these infants that the birth temperature ranged from 96 deg. to 98 deg. F., exceeding 98 deg. F. in but five cases, when it was between 98 and 99 deg. F. In one it was 94 deg. F. During the twenty-four hours following birth there was a rise in the temperature usually of about one degree. From this time on, there was little variation in the temperature, when the child was well, regardless of the age. There would be a variation at different times of the day of a fraction of a degree, it being higher in the evening. Upon looking over the charts upon which the results were chronicled, one is impressed by the uniformity of the temperature, ranging, as it does, within fairly narrow limits from 98 deg. to 99.2 deg. F.

Instances when the temperature rose to 99.5 deg. F. were occasionally seen, but 100 deg. F. was very unusual. It is not claimed that the temperature of a well child may not reach 100 deg. F.; in fact, there were occasions when it rose to 101 deg. F. and illness could not be proved, and had not the temperature been taken for the purpose above mentioned, no elevation would have been suspected, for when next taken, the temperature was normal. In those cases in which a rise was proved to be an early sign of illness, the recording of the temperature was discontinued and the first reading was not included in the observations. In one child a temperature of 103 deg. F. was found. It remained at this point for three hours, when it fell to normal without any other manifestation of trouble. When, however, the thermometer registered over 99.5 deg. F., some cause for the elevation could usually be discovered; though it may have been nothing more than excitement of a slight indigestion.

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[1] Read by invitation before "The Medical Society of the Borough of the Bronx," November, 1906.

Several years ago I personally made a similar series of observations at the Country Branch of The New York Infant Asylum in twenty-five healthy children under eighteen months of age. The temperatures were taken four times a day, the observation extending over an entire week. It was found in these well children that the temperature varied from 98 deg. to 99 deg. F. When it rose every day above 99.5 deg. F., some abnormal condition was always found to explain it.

Judging from these observations in seventy-four well children, ranging in age from birth to eighteen months, whose temperatures were taken several hundred times, it would seem that a daily rise above 99.5 deg. F., may be considered abnormal. An occasional rise, however, considerably higher than this, as above mentioned, may occur and does occur in perfectly healthy children, without being of any special significance.

Fever. By fever, then, in infants and children we understand an increase above that which is considered the normal body-temperature.

In children, for clinical purposes, the rectal temperature should always be taken. For those under five years of age, the mouth is unsafe, because the child is apt to bite off the thermometer bulb, and unreliable, because the lips will not remain closed the requisite three or four minutes. The axillary temperature is thoroughly misleading and should never be depended upon. Thermometers should be carefully disinfected with alcohol after using. One-minute thermometers, according to my observations, are often unreliable and should not be used.

The highest temperature personally known to the writer was 111 deg. F. This was as high as the thermometer could register. It occurred in a child of ten months who was in a convulsion, which was one of the first symptoms of a tuberculous meningitis.

The child had been placed by the parents in water at a temperature of 115 deg. F. It had been in the water about ten minutes before the rectal temperature was taken. How much the temperature was due to the illness and how much to the hot water will never be known. The temperature responded promptly to a cold bath. The child never regained consciousness and died of meningitis ten days after the initial convulsion.

Fever may or may not be an index of the gravity of a disease; thus we frequently have a temperature ranging from 103 to 105 deg. F. in tonsilitis, acute indigestion, and stomatitis—ailments which respond very quickly to treatment and which present no serious aspects. In typhoid fever, pneumonia, scarlet fever, and diphtheria, however, when the temperature range is above 104 deg. F., it is a symptom of considerable value, as indicating the severity of the infection; so that it is not the fever itself, but the condition back of and associated with it, which makes it a sign of clinical value. In pneumonia, children bear a comparatively high temperature, 104 deg. F., for example, without much discomfort or danger; while in the acute intestinal disorders of summer, an equal degree of fever is borne very badly, and if continued is of grave significance. This must be kept in mind in our dealings with fever.

When is a given temperature to be interfered with, is a question which concerns all practitioners. This depends to a great extent upon the cause of the fever and its effects upon the patient. If the fever produces diminished assimilation, loss of sleep, irritability, and restlessness, it will do the child harm by diminishing the normal resistant to disease, and should be relieved whether it is 102 deg. F. or 105 deg. F., so that interference is dependent not so much upon the height of the temperature as upon its effects upon the patient.

The methods of relieving fever are: (1) *Elimination.* This applies particularly to the gastro-enteric tract and the skin. In a majority of the cases of high fever due to an acute indigestion with resulting toxemia, a purgation, a bowel-washing, and a carefully adjusted diet for a day or two, and the case is well. We remove the cause of a fever, and the fever subsides. Unfortunately, this means of controlling fever is limited to the gastroenteric tract. (2) *Diaphoresis,* by which is understood the production of an excessive perspiration, will also relieve high temperature. The most reliable way of bringing this about in a child is by the use of moderately heavy covering and the administration of the tincture of aconite, in doses of one-half to one drop every hour,—eight doses in twenty-four hours; or liquor ammonii acetatis, two drams every two hours, for a child one year old. (3) By far the most satisfactory means of controlling fever depends upon the local abstraction of heat by means of *sponging, tub-baths,* and *cool packs.* (4) *Antipyretic drugs.* Much which borders on the sensational has been written about the harmfulness of antipyretic drugs, particularly the coal-tar products. Used in large and frequent doses, they certainly may do a great deal of damage; under certain conditions, used in small doses and repeated at intervals of from three to six hours, they may be and often are of benefit. Aconite and the liquor ammonii acetatis are of some value, as above stated, but they are of little value in controlling a very high persistent temperature. The coal-tar products furnish the best antipyretic drugs and may be used with safety, but should be used only when, for any reason, the local abstraction of heat by the application of cold is impossible. In many families, there is too little intelligence to make a cold pack either possible or safe. In severe cases of pneumonia and scarlet fever, and in the intestinal diseases, sponging often will not answer. Only a trained nurse or a very intelligent mother should be entrusted with a pack. Moreover, sponging and tub-bathing, if repeated too frequently, particularly during the night, exhaust the child. Spongings or tub-baths are often strenuously objected to by parents as well as by the patient, and if the nurse is one of the family, her sympathy will counterbalance her judgment, and the result be far from satisfactory. Under such conditions, when the application of cold to the skin is impossible, a combination of phenacetin and caffein, alone or with Dover's powder, has proved effective. The antipyretic treatment of scarlet fever is the same as that of pneumonia or typhoid fever. My use of antipyretic drugs has been confined almost entirely to the ignorant in private work, and to dispensary patients. For a child of one year or under, one grain of phenacetin with one-fourth grain of citrate of caffein may be given and repeated at three-hour intervals if the temperature requires it. For a child two years of age 1½ grains of phenacetin and ½ grain of citrate of caffein at three-hour intervals; three years and over, 1½ to

2½ grains of phenacetin with ½ to 1 grain of citrate of caffein, at intervals of from three to six hours. If there is much restlessness and irritability which is not thus controlled, Dover's powder may be added—¼ grain to each dose for a child of from three to six months of age; ½ grain between six and twelve months; one grain after the age of two years is reached. It is always wise to caution parents as to the use of Dover's powder in children. They should be told that if the child becomes "heavy," or difficult to arouse, the powders must be discontinued. That phenacetin and citrate of caffein cannot be given in solution is unfortunate. Like all insoluble powders, they are best given in some mucilaginous mixture, such as barley-water or one of the cereal jellies. Fruit-juice or apple-sauce usually answers well. Antipyrin, for the reason that it forms a tasteless mixture with water, succeeds better with some intractable children, and may be used in the same doses as phenacetin, although as an antipyretic it is less efficient.

Obscure Elevations of Temperature.—Perhaps the most annoying cases in pediatric work are those with an elevation of the temperature for which no adequate cause can be discovered. In the section on Normal Temperature, certain possible variations are given which I regard as within the limits of health. When these boundaries are passed, when there is a temperature range between 99 deg. and 101 deg. or 102 deg. F., or a temperature persistently at 100 deg. or 101 deg. F., without any apparent cause, and continuing for days and weeks, the medical adviser is not in an enviable situation. Such cases coming to the pediatrist through consultation or otherwise are sometimes easy of solution. At other times, however, the cause of the fever may never be discovered, and the patient eventually gets well, leaving us in ignorance.

Active Exercise in Nervous Children.—This is not infrequently the cause of an elevation of the temperature. I have seen several cases of this nature. A few years ago, I saw in consultation a country child three years of age, whose temperature every afternoon at one o'clock was 102 deg. F. The child, while not vigorous, showed no sign of illness. He ate well, slept well, and played hard. There was a slow gain in weight. The fever was discovered by the mother, who thought that the child, who was a blonde, looked flushed every day at about the same time.

The temperature by rectum was normal in the morning and normal at night. This condition, to the attending physician's knowledge, had persisted for six weeks before I saw the patient. How long there had been a daily elevation of the temperature above the normal before the mother discovered it, we have no means of knowing. The doctor, an excellent practitioner, had examined the child and treated him for various diseases; the first being malaria, with no response to quinine. Then followed treatment for typhoid fever as by suggestion and constant inquiry the child came to imagine that he must be sick, and complained of languor. The fever continued, however, beyond the usual time allowance for typhoid and there were no other symptoms. There was no enlargement of the spleen and the blood had been repeatedly found negative to the Widal reaction. Other possible causes of the fever were also given attention. One day the doctor suggested tuberculosis. This aroused the family and friends and a consultation was the immediate result. In company with the doctor, I saw the child at its home. I found a rather thin blonde boy, three years old. The family history was excellent. There was one other child, six years of age, who was well and a good specimen of robust boyhood. The patient had never had a pulmonary disorder and no disease of the respiratory tract other than slight bronchitis. There was no apparent association of the condition with any intestinal or infectious disease. An exhaustive physical examination failed to reveal any abnormality other than a small umbilical hernia and a slight enlargement of the inguinal and submaxillary glands. The blood was not examined. The child was pale and doubtless a blood examination would have revealed a mild secondary anemia. The appetite was fairly good; the bowels were reported regular and his stools normal. The child had not been kept in bed, as the family did not consider him very ill. The physical examination being negative, I questioned the mother very closely as to the child's habits of life. I found that he rose at 7 A.M., had breakfast at 7.30, played with his big brother and two older boys until one o'clock, when he had dinner. A glass of milk and a piece of bread and butter were given as a luncheon at 11 A.M. I found that he played very actively, kept up with the older boys, and was unhappy when he was not with them. Attempts had been made without success to entertain him with less strenuous play. It was at midday, sometimes before, sometimes after dinner, that the temperature reached the highest point. It seemed to me that here, probably, was a case of fatigue temperature. I accordingly suggested that the boy be undressed and put to bed at 11.15 A.M. after the light luncheon and be made to rest and sleep if possible. At 1.15 he was to be taken up for dinner, his temperature first being taken. These instructions were faithfully carried out, and I am pleased to state that this ended the daily rise in temperature. The case was one of an active, nervous child becoming overtired in his attempts to hold his own with older and stronger boys. The patient improved rapidly in his physical condition and is now, after an interval of three years, perfectly well.

Another child, four years of age, was seen in consultation with a New York physician because of a daily elevation of the temperature of from 100 to 102.5 deg. F., which had continued for six weeks. The child was thriving and otherwise perfectly well. No cause of the fever could be discovered in his physical condition. He had a noisy, excitable nurse, who was inclined to exciting games and rough play with the boy. With a dismissal of the nurse the fever ceased.

Otitis.—Persistent fever, following the acute catarrhal affections of the upper respiratory tract and the exanthemata, is sometimes explained by a suppurative process in the middle ear, without other symptoms than the fever.

Encysted Empyema.—A small area of encysted empyema may explain a persistent fever, following pneumonia. Holt describes a most interesting case of this nature in which there was for over four weeks a temperature range from 100 deg. to 105 deg. Autopsy showed a small collection of pus between the diaphragm and the lung.

Periodic Fever.—Not infrequently we see cases which show some of the clinical signs of malaria as regards periodicity in the temperature, but without splenic enlargement, or the presence of the malarial organism in the blood. Yet, often, these cases quickly respond to full doses of the bisulphate of quinin.

Typhoid Fever.—Occasionally a case with low persistent temperature elevation, obscure for a week or two, proves to be a mild typhoid.

Tuberculosis.—An elevation of the temperature is sometimes the first premonitory symptom of tuberculosis. Tuberculosis in a child, however, is usually an active process when it involves the lungs, and can readily be made out. When other parts are involved, such as the bones, glands, skin, or peritoneum, the manifestations are usually sufficiently plain to indicate the condition.

Intestinal Infection.—Intestinal infection of a latent type may be the cause of persistent fever. In a suspected case, in the absence of bowel symptoms, it is well to give a laxative and put the child temporarily on a reduced diet consisting largely of carbohydrates.

Unexplained Elevations of Temperature.—I have known children to run an unexplained temperature of from 100 deg. to 101.5 deg. F. for weeks, without any other sign of illness. I have had these cases examined by eminent consultants and I have seen them recover without a diagnosis. Of one thing, however, we may rest assured. If a competent, thorough examination of the patient does not reveal the cause of the temperature, we are safe in concluding that there is nothing of a very serious nature back of it.

Illustrative Case.—The history of a case of this kind, which gave me no end of trouble and annoyance, may not be without interest.

The patient, an eight-year old boy, was the only son of a habitually anxious mother, who had unfortunately learned to use the clinical thermometer. She took her boy's temperature after school one day early in December. She found that the thermometer registered 100.5 deg. F. I was consulted, saw the boy in the evening, took his temperature, by mouth, with my own thermometer, and found it 100.8 deg. F. with no other evidence of disease. He was perfectly normal in every other respect. He maintained that he felt well, did not need a doctor, and wished to be let alone to study his lessons. The following morning the temperature was 100 deg. F.; in the evening it was nearly 101 deg. F. For six weeks this temperature range continued, never below 100 deg. F., never higher than 101.2 deg. F. The boy, against my advice, was taken from school. He was put to bed, and a half-dozen consultants saw him without shedding any light on the case. Finally the mother became reconciled to "doing nothing" for her son, and he was taken to a nearby winter resort. I suggested to the father that before leaving town he should "accidentally" drop the thermometer on the hardwood floor and then refuse to have another in the house. This he managed to do, straightway. The boy had an excellent time at the winter resort, played with his sled in the snow, skated on the lake, fell through the ice once and received a thorough wetting, without harm. In three weeks he returned, improved as much as any city child improves from a country outing. His temperature was not taken during these three weeks at the winter resort and has not been taken since, except where there were evidences of illness. He is now devloping along normal lines and is a fair physical specimen for his age.

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The Treatment of Strabismus in Young Children.—ALFRED R. BAKER M.D. (Journal A. M. A., July 13, 1907). Following the dictum of Douders of the intimate relationship between convergence and accommodation, Baker believes the rational cure of strabismus to be an early correction of all refractive errors. This means a correction even before the age of reading test letters. Almost every child is born hyperopic and therefore potentially capable of acquiring convergent squint. He mentions three stages: First, occasional; second, alternating; finally, terminating in (third) a permanent monocular squint with a necessary deterioration of vision in that eye. The most favorable time for cure by correcting refractive deficiences is during the first stage. Sometimes instillation of atropin is sufficient; if not, test for errors at once most carefully. Even in the second stage, good results may be obtained. In older children with alternating strabismus, exercises to train fusion sense combined with avoidance of near work, atropin to relax accommodation and outdoor play, will usually effect a cure. In the third period an operation is the rule, but first a thorough examination should be made giving the fullest correction under atropin patient will accept. If such glasses do not restore binocular vision, surgical interference is a last resort and in a sense a confession of defeat. In testing eyes of young children, Baker relies almost entirely on the retinoscope.

I. M. HELLER.

TYPHOID FEVER IN INFANCY AND CHILDHOOD.[1]

By Louis C. Ager, M.D., Brooklyn, N. Y.

Before beginning a discussion of the disease itself it will be a logical procedure to determine as far as possible how frequently typhoid fever occurs in the earlier years of life. This is a point upon which there has always been a wide divergence of opinion, and even now there are decided differences in the teachings of various authorities.

Long after typhoid was definitely differentiated from typhus it was generally considered to be a disease of adult life only. Although Rilliet published his classic work in 1839 his teaching in regard to this disease does not seem to have been generally know or at least accepted for many years. The fact that typhoid in early life was so long overlooked and that at the present day it is not always recognized is due to its marked difference from the adult type. Before the days of the Widal test this was often excusable. It is now time, however, that every case of continued or remittent fever in children should be regarded with suspicion, and the Widal test be tried repeatedly if necessary before typhoid is excluded. When this practice becomes more general it is probable that infants under two will be found to suffer from a typhoid infection much oftener than is at present supposed.

Anyone who has made autopsies on children is aware that Peyer's patches are frequently the seat of inflammation in various forms of enteritis. In fact Northrup has always insisted that these glands are so often affected and in such a variety of conditions that even their ulceration is not diagnostic of typhoid in infants. Nevertheless we meet physicians now and then who advance the old argument that children cannot have typhoid because Peyer's patches are not developed. This argument does not appear in any book on the subject but it must have been widespread at some time. After considerable search I find that L. Helwig states that these glands are fully developed at the sixth month of intrauterine life. Dr. Morse and others have reported a number of cases of intrauterine infection.

From the mere question of contact with the source of infection it would seem that children would be rather liable to contract typhoid. They are not very cleanly in their habits, they come closely in contact with the soil, they drink water very indiscriminately, and they usually drink a large amount of milk. On the other hand they do not travel as much as adults and they do not eat as much raw food. Have they then some means of eliminating the infective material more readily than adults? Are they not susceptible to typhoid infection? At the meetings of the American Pediatric Society in 1892, 1895 and even as late as 1900 Northrup has insisted that children under two are not susceptible. He admits that cases have occurred but only in instances in which the organism was overwhelmed by the amount of infective material. Further he quoted Drs. Kerley and Holt, and Dr. Noyes of Philadelphia as stating that a review of several thousand autopsy records from various infants' hospitals failed to show a single case of typhoid in a child under two years. Such figures only prove how deceitful statistics may be. Since they were compiled two important advances have been made in medical science: first, the Widal test; second it is fully recognized that in young infants autopsy findings after typhoid are too diverse to be of diagnostic value. At the 1905 meeting of the Pediatric Society Drs. Hand and Gittings submitted an analysis of 145 cases of typhoid in children, ten of which,—over 6 per cent.,—were under two years. Earlier clinical reports are in marked contrast. In the Montclair epidemic of 1894 only 3 reported cases out of 115 were in children under two, and in the Stamford epidemic of 1895, out of 406 cases only 4 were under two.

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[1] Read at the joint meeting of the Pediatric Section and the Medical oSciety of the County of Kings, June 18, 1907.

After the first two years typhoid becomes much more common, but there is still considerable difference of opinion in regard to the figures. This is partly due to actual variations in the percentages of various epidemics. It is undoubtedly true that in epidemics due to milk infection, the proportion of cases in children is larger than in instances of infected water supply. In regard to the age distribution of cases under 15 years Holt has collected the following figures. Total number of cases under 15 years, 970; 8 per cent. of these were under 5 years, 42 per cent. between 5and 10 years and 50 per cent. between 10 and 15 years.

Mortality Statistics.—In the study of contagious diseases the mortality statistics are apt to lead to conclusions quite different from those reached in a study of reported cases.

This is due to the fact that many mild cases are not reported. The following table compiled from the U. S. Census of 1900 is worthy of a more careful study than can be given to it this evening. Some of the percentages are as follows:

TYPHOID FEVER AND POPULATION. NEW YORK STATE.
(U. S. Census, 1900.)

Ages.	Deaths from Typhoid.	Population.	Deaths to Population.	Scarlet Fever.
Under 1 year..	10	159,521	1 in 16,000	(51)
1 year.........	14	142,000	1 in 10,000	(113)
2 years........	17	151,000	1 in 8,800	(142)
3 years........	16	151,000	1 in 9,500	(133)
4 years........	15	150,000	1 in 11,000	(97)
Under 5 years.	72	753,000	1 in 10,000	(536)
5-9 years.......	80	713,000	1 in 8,800	(184)
10-14 years....	117	643,000	1 in 5,500	(32)
15-19 years....	205	640,000	1 in 3,100	(21)
20-24 years....	276	702,000	1 in 2,800	(16)
25-29 years....	212	695,000	1 in 3,200	(7)
30-34 years....	213	617,000	1 in 2,900	(6)
35-39 years....	163	560,000	1 in 3,400	(4)
40-44 years....	108	462,000	1 in 4,200	——
45-49 years....	78	387,000	1 in 5,000	——
50-54 years....	65	313,000	1 in 4,800	——
55-59 years....	61	239,000	1 in 3,900	——
All ages.......	1,762	7,268,000	1 in 4,100	——

Over 15 per cent. of all deaths were in patients under 15 years of age. Of this 15 per cent.: 9 per cent. were under 2 years; 26 per cent. were under 5 years; 29 per cent. were between 5 and 10 years, and 43 per cent. were between 10 and 15 years. These figures will be taken up again in the discussion of the prognosis.

From all these figures the conservative conclusions are as follows:

First; typhoid fever is less frequent in childhood than in early adult life, but the difference has been greatly exaggerated in the past.

Second; as children are as frequently exposed to typhoid infection as adults they must be in some way better able to resist that infection. This might be due to one of two causes,—to a specific immunity,—or to a condition in the digestive tract unfavorable to the retention and development of the bacillus. So far as we know the non-nursing child has no specific immunities. There are, however, two ways in which the conditions in the normal child's intestinal tract differ from those in the adult. First, it empties itself more readily. Second; in the small intestine of the milk-fed child the prevailing bacteria are of the lactic acid group and the bacillus coli communis is rarely found above the colon until a general diet takes the place of milk. This difference in intestinal flora may have some bearing on the problem.

Mode of Infection.—As has been said before, the water or milk supply would naturally be held responsible for most typhoid infections in children. In my own experience the milk has been most frequently at fault. Nevertheless rather a large proportion of secondary cases occur in children, particularly when the mother is at the same time nurse and housekeeper. I have three such cases to my account.

It appears from a recent report of Jules Lemaire that these "interior" cases occur quite frequently in the French hospitals, for he discusses six such cases occurring within six months in one ward of a Paris hospital. After reviewing the problem of the possible carriers of infection,—thermometers, basins, dishes, etc., he concludes that the transmission is by personal contact with an uncleanly physician or nurse. As a result of these researches Lemaire is convinced that typhoid patients ought to be isolated as far as possible and they ought to have separate nurses, baths and utensils.

Pathology.—The pathological lesions in children vary widely, but as a rule they are much less marked than in adults. This probably accounts for the shorter period of pyrexia. Although the agminated glands are usually more or less affected extensive ulceration is very unusual and cases are on record in which no intestinal lesions were found. In mild cases the findings are similar to those of a simple enteritis and as a consequence there is little absorption of putrefactive toxins in the later period of the disease. The study of the pathology is rendered more confusing by the fact that lesions closely resembling those of typhoid in the adult are frequently produced in children by various toxic processes. Rotch says "in infants, swelling of Peyer's patches and of the solitary follicles is not distinctive of typhoid fever as it frequently occurs from irritations of various kinds." On this fact Northrup has repeatedly laid stress in denying the frequency of typhoid in children.

Diagnosis.—The diagnosis of typhoid should be considered from two points of view. From the clinical standpoint,—for the benefit of the patient an early diagnosis is important.

From the statistical standpoint the essential feature is an accurate diagnosis, the period of the disease at which it is made being a secondary consideration. From the latter point of view the Widal test is the essential method. It should be applied at frequent intervals throughout the course of the disease or until a diagnosis is established, and from the statistical standpoint at least it should be the determining factor. Although it has no direct bearing on the question of diagnosis, I would like to repeat the plea made on other occasions for a more careful collection of statistics in regard to the Widal reaction. It certainly indicates some very definite bio-chemical change in the blood, and its various delays, irregularities, absences, etc., probably would have some bearing on the prognosis if we understood them better. For such a study a Widal test curve ought to be plotted from the beginning to the end of a large number of cases for careful comparison with the other features of the cases.

The diazo reaction is of diagnostic value in connection with other symptoms. Its one superiority to the Widal test is that it usually appears a day or two earlier. Unfortunately it appears in such a variety of intestinal toxemias in children that it is even less pathognomonic than in adults. From the clinical standpoint Hollopeter writes as follows: "The Widal test and the diazo reaction are of very little value prior to the beginning of the second week. At this time we have additional symptoms to confirm the diagnosis thus reducing the value of the tests." But a little further on in the same paper he presents a very practical argument for the routine employment of the Widal reaction. His words are as follows: "Many cases of typhoid brought under my notice have been previously treated for pneumonia, and many cases were classified as typhoid which were chronic food poisoning."

There is one other point in relation to the Widal test that seems almost too trivial to be mentioned, yet it comes up at times. There are physicians who excuse themselves for not employing this means of diagnosis on the ground that the parents will not allow it. This surely implies a lack of tact in dealing with the minor problems of pediatric practice.

For the early diagnosis of typhoid the most valuable method is by blood culture. Unfortunately this is not feasible in routine private practice unless there is some urgent reason for it.

Apart from these laboratory methods the diagnosis must rest upon the clinical symptoms as a whole, for there is no one symptom that is always present and there is no symptom of typhoid that may not be found in other diseases. In my experience typhoid is usually prevalent when children are affected, which is a great help in diagnosis. As a rule the younger the child the more irregular the symptoms, although there are frequent exceptions to this rule.

Some authors lay stress upon the difficulty of differentiating typhoid in young children from meningitis. In such cases lumbar puncture is of great value, although this test has an aggravating way of being indecisive at times when something positive is most needed.

Lobar pneumonia with delayed physical signs will closely simulate typhoid particularly when it is ushered in with vomiting, epistaxis and headache.

Symptoms.—In this connection the age is an important factor. Under three years the disease often has the appearance of a subacute gastroenteritis, with mild cerebral symptoms. The temperature is very irregular, often remittent. The stools are rarely of the typhoid character, but are green and watery. Tympanites is slight or absent and delirium is unusual. The spleen is only moderately enlarged, certainly in some cases it is not palpable. Emaciation is rapid and prostration is extreme. The urine is often albuminous and the heart may show signs of degenerative changes.

The more frequent type,—the typhoid of children is more like the mild typhoid of adult life. The onset is apt to be sudden, with high initial temperature, sometimes 104 within the first 48 hours. Vomiting is as frequently an initial symptom in typhoid as in other acute infections. Epistaxis is seen in much less than half of the cases. Headache is not complained of in many cases but if asked the patient will describe head pains of some kind.

The Spleen is moderately enlarged by the second week in most cases. It must be remembered, however, that owing to its movability and softness, and to the child's natural resistance, very careful palpation is needed to recognize it.

The Mouth shows the same symptoms of coated tongue, sordes on the teeth and sore lips as in the adult, but these conditions come on later, are less severe and clear up more quickly than in later life.

The Digestive Tract is always inflamed but the degree varies greatly, and the intestinal symptoms differ accordingly. Diarrhoea is not as frequent as in the adult and is rarely severe. Moderate constipation is often present. These statements are directly opposed to the French teaching but they coincide with most descriptions in this country. Pater and Halbron describe a syndrome of green vomiting and green diarrhoea which was almost always fatal and which was the chief cause of their high death rate.

The Eruption varies greatly as do opinions as to its frequency. It is probably true of children as of adults that an eruption is seen more frequently in some epidemics than in others. The personal equation must also be taken into account, for all sick children have spots of one kind or another. In Dr. Morse's series of cases an eruption was present in 60 per cent. In my experience it has been rather more frequent. In *some prolonged* cases a hemorrhagic eruption is seen, resembling purpura. It does not have any special influence on the course of the disease, and it clears up with improved nutrition.

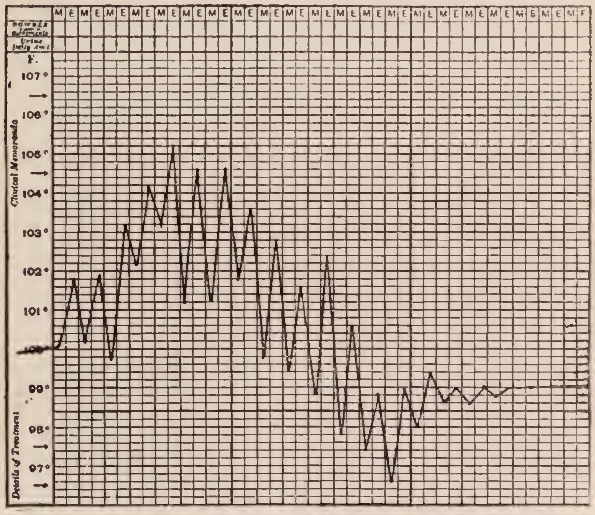
The Temperature, as was said above, is apt to be higher at the onset than in the adult, sometimes 104 in the first 48 hours. This is an important point in connection with the prognosis, for these cases do better than the sudden onset might indicate. During the first week the fever remains high. According to Holt the remittent character is less marked than in the adult but this has not been my experience. In fact the diurnal variations in the temperature curve are a frequent cause of a mistaken diagnosis of malaria.

Chart No. 1 represents such a case, treated for a week by the family physician for malaria, although typhoid was epidemic at the time. This mistake is particularly liable to occur when the physician sees a case once a day and takes the mother's word that there was no fever early in the morning. In these mild cases the skin will frequently give the impression of a normal temperature when the thermometer, per rectum, indicates 100 or over.

In contradistinction to many other infections a continued high temperature is fully as indicative in the child as in the adult of a severe attack of typhoid.

The temperature-pulse ratio if properly interpreted, is of great diagnostic and prognostic value, more so than in other diseases. It will sound the alarm of the various complications,—particularly perforation, hemorrhage or pneumonia, before other signs appear. This is a point that *must* be impressed upon the nurse.

Chart No. 2 illustrates this fact very well. The case was serious from the beginning, and the pulse ran rather high. The sudden drop in rectal temperature and rise in pulse was discovered by the nurse before any other symptoms of hemorrhage showed themselves, and made a diagnosis possible almost at once.



No. 1.

The most important characteristic of the course of the fever in children is its usual short duration. It frequently lasts but ten days or two weeks, and even shorter cases are seen. This is probably the chief reason for the favorable prognosis of most authors, for in the more prolonged cases the emaciation and general prostration are the chief danger.

The Mental Manifestations are as a rule different from those in adults. Holt says "the typhoid of early childhood may be described as a fever, characterized more often by nervous symptoms than by intestinal symptoms." The ordinary typhoid delirium is unusual. When delirium is present it is intermittent and is often of a more violent type. There may be paroxysms of terror in which it is difficult to prevent the patient from injuring himself in attempts to escape from some imaginary peril. These attacks closely resemble a severe form of night terror. More frequently there exists a condition of extreme nervousness and fear without hallucinations. The patient will scream at the sight of a stranger and even members of the family cause mental distress. This is frequently accompanied with insomnia, a symptom that may need radical treatment.

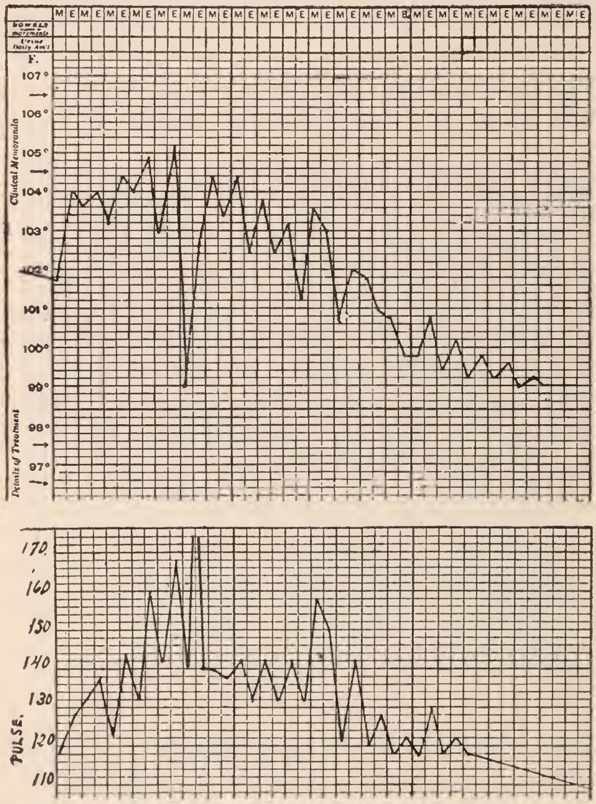


CHART SHOWING THE TEMPERATURE AND THE PULSE RATE IN CASE OF TYPHOID FEVER WITH INTESTINAL HEMORRHAGE.

(No. 2.

The Heart in these mild cases does not appear to be greatly affected, but if the fever is prolonged beyond two weeks the myocardium soon gives evidence of degenerative changes. On this account the pulse should be watched carefully, and it is important to observe it for several minutes at a time and to make several examinations during each visit in order that a beginning irregularity may not be overlooked.

Complications and Sequelae.—All American writers agree that complications and sequelae are rarer and of less danger in children than in adults. Some French writers, on the other hand, contradict this idea very emphatically. Pater and Halbron, in language that sounds almost resentful, cite "the multitude of severe, if not fatal complications which are common to typhoid in children." These conflicting statements will be mentioned again in connection with prognosis.

Bronchitis is so common in typhoid as to constitute a symptom rather than a complication. There is an opportunity here for some exceedingly practical and valuable investigations in regard to the cause of the simultaneous involvement of the digestive and respiratory mucosae.

Pneumonia not infrequently accompanies or follows typhoid, more rarely it precedes it. As a rule it is not a dangerous complication, the prognosis depending upon the nature of the individual case. On this point I am glad to be in agreement with Pater and Halbron, whose large experience adds weight to their figures. They say in this connection: "Pulmonary complications are seen with remarkable frequency and sometimes lead to incorrect diagnoses in the first stages. * * * * We have seen the enormous figures of 12½ per cent. acute pneumonic involvement. *All these cases were benign.*" In direct contradiction is the statement of Brouadel and Thoinot who say "typhoid broncho-pneumonia, at whatever moment it appears, *rarely allows the patient to survive.*" It is quite possible that these two statements are not as contradictory as they appear at first sight. The first probably refers to asthenic lobar pneumonia, the second to asthenic broncho-pneumonia. The latter writers may therefore be referring to the inmates of institutional homes and the former to the statistics of hospitals.

The Nervous System is frequently the seat of complications in typhoid. Meningeal irritation of various degrees is not uncommon but meningitis is said to be extremely rare. A case in which a boy of five was fed for five days through a nasal stomach tube on account of coma, opisthotonus and general muscular rigidity gave the impression of a true meningitis. But the patient recovered to die four years later from the effects of myocardial degeneration.

Neuritis of a mild type is seen occasionally but it clears up rapidly as nutrition improves.

Chorea, according to Holt, is seen rather oftener after typhoid than after the other infectious diseases.

Otitis of a severe type is seen very often by the French observers, perhaps as a result of a previously existing adenoid inflammation.

Suppuration of Joints and other serous cavities is met at times. It may be due to the typhoid bacillus itself or to some secondary infection.

Tubercular infection of course occurs from time to time.

Intestinal Hemorrhage is said to occur in about 3 per cent. of the cases, usually in older children. Holt's youngest case was 4½ years old. The mortality is nearly 50 per cent. Chart No. 2 has already been called to your attention. The patient, a girl of 2½ years, recovered after two hemorrhages.

Intestinal perforation is of course even rarer than hemorrhage. Crozer Griffith has made a study of this complication and reports six cases. Undoubtedly some cases die unrecognized. It is more frequent in older children, but one of Crozer Griffith's cases was only four years old. Early diagnosis and immediate operation will save fully as many cases as in the adult.

Bed Sores or rather ulcerations on knees, elbows, heels, or wherever the bones are prominent are almost certain to occur in the more prolonged cases in which emaciation is extreme. They are, however, more in the nature of acute abrasions than of the indolent ulcers of older life. They are very distressing to parents, and it is important to protect the nurse from criticism. Fortunately they heal with remarkable promptness as soon as food assimilation begins.

Myocardial Degeneration is to my mind one of the most dangerous results of typhoid fever. It is more easily overlooked and it is more lasting than the other complications. It may be as severe as in diphtheria but as a rule it is a more chronic process. If the patient is to survive the severer forms the watchfulness and care must be absolutely uninterrupted, and the child must be kept without muscular effort of any kind. Fortunately these patients are so emaciated that it is much easier to keep them on their backs than in cases of diphtheria.

In addition to these definite complications various conditions due to muscular degeneration and enervation occur in the protracted cases under three years of age. These little patients usually have to learn to walk and talk anew, and they have frequently forgotten more or less of their acquired knowledge of environment. The muscular and tendonous relaxation is suggestive of a true paralysis and we might expect to see secondary contractures and deformities, but in my experience improvement is too rapid for them to occur.

Typhoid Spine has been reported in older children.

Prognosis.—Upon this point there is a wider diversity of opinion than upon any other side of the subject. The difference between the mortality statistics of prominent French pediatrists and writers in this country is extraordinary. Pater and Halbron,—already referred to,—presented this topic before the French Pediatric Society last year. Their death-rate had been 14½ per cent., an improvement over the 17 per cent. reported by Guinon in 1898. Brunon reports a rate of 17 per cent. reduced to 3 per cent. by serum treatment, and Josias reports a reduction by the same means from 12½ per cent. to 3.8 per cent. These are certainly remarkable figures. The conclusion is forced upon one that a line of treatment that could be changed with such startling results, must be what Dr. Morse refers to when he says: "The tendency in all these cases is to get well no matter what the treatment, unless it is absolutely bad." Pater and Halbron, on the contrary, severely criticise such remarks and state their position in the following emphatic terms: "May we be permitted to again insist upon the gravity of typhoid in children. We unite with the number of pediatrists who deny the false idea of its benign nature, so often expressed,—an idea which in no way rests upon clinical study or upon the prognosis from actual epidemics." This is in accord with the views of such men as Variot and Barbier. Apparently no American writers support these ideas. Dr. Morse has been quoted. Dr. Read said some years ago, "the most noticeable difference in the typhoid of adults and children may be said to be the mildness of the disease in children." From my own experience I would conclude that the death-rate should be under 4 per cent. although figures would vary in different epidemics.

On the other hand the comparison of the percentages of deaths at different ages compiled from the U. S. Census, 1900, State of New York, with the percentages of cases at different ages as given by Holt seems to support the French rather than the American view.

Feeding.—Of all the problems involved in the successful treatment of typhoid in children this question of diet is most important, and its proper solution is most fully appreciated by the parents. The parental standpoint is too often neglected in dealing with children, although it has a practical bearing upon the successful treatment of any condition. It is demoralizing to the regimen of the sick-room to leave directions that cannot be carried out and it is distressing to parents to see a child wasting away without any apparent attempts at feeding; or to see the patient exhausted by ineffectual attempts at forced feeding. At the very outset, therefore, it is best to explain to the parents the condition of the digestive tract and the resulting necessity for its complete rest. If they understand that the child cannot digest food,—that the fever will produce profound emaciation, but that the return to normal weight will be rapid as soon as recovery sets in,—they will be satisfied to wait for results. This is the first step.

The second step can be stated in a few words. Feed the patient exactly as you would in other forms of acute ulcerative ileo-colitis. One of the most tenacious, and I would almost say, pernicious of medical superstitions is the idea that TYPHOID spells milk diet. When this idea was promulgated typhoid fever referred to adults, and milk was considered a liquid diet. We are not dealing with adults and milk is not a liquid diet. In treating a child with any of the hot weather disturbances of the digestive tract we first stop milk. Why not be logical and stop the milk in typhoid?

Fortunately instinct has played a large part in the care of these children and they usually refuse to take milk. You may have ordered a milk diet but if you foot up the actual 24 hours consumption it will be found very small,—if the nurse is accurate.

Furthermore do not be deceived by the idea that you are predigesting the milk by the addition of a little pepsin.

If the patient takes nothing but plenty of cold drinks, plain or carbonated, for the first few days no harm is done. Weak cold tea, as recommended by Jacobi, is slightly stimulating and is particularly useful if nausea is present. Later, dextrinized gruels, hot or cold broths, beef juice, raw egg, whey and ice-cream made with whey or malted milk, and the various proprietary foods will furnish ample nourishment until there is a desire for food. In mild cases the patient will begin to ask for food at the end of the first week or ten days, when the morning temperature drops to 99-100. This is an indication for peptonized milk as a beginning and milk toast, soft eggs, and bread and butter as they are demanded. It is unquestionably a mistake to wait for a twenty-four hour normal temperature before a light diet is begun. The slight afternoon rise, with flushed cheeks, langour or restlessness is *inanition* fever and will be cured by feeding, not by starvation. The idea that early feeding has anything to do with relapses is amply disproved by a study of such cases.

As these ideas have at times in the past been criticised by some physicians it is a satisfaction to see that they are in accord with the recent teaching of a number of pediatrists. Crozen-Griffith stated two years ago that he had abolished the strictly liquid diet; that the long continuance of the debility and emaciation is the result of insufficient nourishment, and that not infrequently the lack of food is the real cause of the continued fever.

Treatment.—Few writers say much upon the subject of treatment beyond the usual platitude,—symptomatic. This really begs the question. It is true that a large majority of these patients will recover without medication. But this renders the more imperative the necessity for a prompt recognition of those cases that need definite drug exhibition. It is the small percentage of cases that do not recover that is the real measure of our ability.

The first symptoms that demand attention are headache, restlessness and fever and hydrotherapy is usually successful with all three. It is quite generally recognized that cold immersion baths are not beneficial in children. They do not react well, the extremities get cold and blue, the internal organs are congested and the heart is often embarrassed. On the other hand frequent luke-warm sponging is distinctly soothing and brings the blood to the surface where it is cooled by radiation. The greatest benefit, however, is obtained by the use of the ice-cap. It will usually relieve the headache and produce sleep and it has a definite effect upon the temperature. I am emphatically opposed to the use of the coal-tar products although their use is again coming into vogue. In some older children moderately cold applications to the abdomen are well borne, but as a rule they are objected to. High rectal irrigation with a saline solution of varying temperature is very useful. It has, however, been carried to a dangerous extreme by some practitioners. There are two dangers in its use: first, as Dr. Morse has said, the vasomotor system is relaxed and there is danger of overloading the blood-vessels and so putting an extra load on the heart; second, the large amount of water sometimes recommended tends to weaken the muscular coats of the intestine and to aggravate rather than relieve tympanites.

The treatment of the digestive tract is greatly simplified by the diet already discussed. Nevertheless some medication is indicated. Here again it is well to forget the systemic infection and treat the entero-colitis. One drug is indicated above all others in enteric inflammation, castor oil. We use it in dysentery without fear of perforation, use it in typhoid. It is soothing to the inflamed mucous membrane, it is astringent, and it carries off putrefactive products. The patient rarely objects to it in the following formula:

Olei ricini
Mucilag. acacae aa oz. iv.
Tr. opii camph.
Ess menth. pip. aa dr i

This may be given in two to four dram doses at two to four hour intervals throughout the disease, or according to the symptoms. It has the same soothing effect as in other inflammatory lesions on the intestine.

Although the term intestinal antiseptic is a misnomer, some preparations are certainly anti-fermentative, and are useful in lessening tympanites and the production of toxic substances. Their use for the purpose of driving the typhoid bacillus out of the general system is justly criticised, but their use as antifermentatives is based upon reason and is justified by clinical experience.

The most perplexing point in the medication in typhoid is the question of stimulation. The stimulants that are most likely to be indicated are alcohol, aromatic spirits of ammonia, digitalis and strychnine. To these may be added strophanthus and capsicum. Certainly none of these should be used indiscriminately and in some cases none will be needed.

Alcohol has been more widely used than any of the others and its use has many times been entirely unjustified. A growing prejudice,—which has been amply justified by recent English studies as to its effect on the liver of the child,—has largely removed it from my armamentarium. IF it is indicated would it not be more logical to prescribe pure alcohol diluted to the desired strength instead of unknown proprietary mixtures like brandy and whiskey? Aromatic spirits of ammonia in doses of 20 to 100 minims will answer the same purpose, will not irritate the liver and kidneys and will give quicker results. Alcohol is definitely indicated, only when we wish to check tissue waste by checking oxidation. The checking of oxidation during fever is a distinctly poisonous process and should only be resorted to when the accumulating toxins are a less evil than the emaciation.

In the choice between strychnine and digitalis it is just as important to remember the differences in their action. Strychnine stimulates the heart through the spinal ganglia, and sometimes increases nerve irritation. Digitalis exerts its chief action directly upon the myocardium, increasing its tone and nutrition. It also increases blood pressure by contracting the arterioles, but this is not usually a disadvantage in typhoid as there is a tendency toward vaso-dilatation in that disease. In case vaso-constriction is contraindicated strophanthus may be substituted for digitalis.

In sudden, alarming collapse the tincture of capsicum in oil or water administered per rectum will act more powerfully and quickly than any other drug that I have tried. In two instances I have seen apparently moribund patients tided over until the other stimulants had time to take effect. Its action is almost instantaneous and very transient. It may be repeated at ten minute intervals for an hour or more. It seems to act as a powerful vaso-constrictor without any permanent local irritation.

It is very important to distinguish a heart that is rapid and irritable merely because the patient is tired by lack of sleep, from a weak heart. In such cases codeine in small doses at two to three hour intervals is the best remedy.

In case of hemorrhage there are two extremes to be remembered. Collapse must not go beyond control; blood pressure must be kept at the lowest limit of safety. In adults morphine is used most frequently for this purpose. In children codeine phosphate controls the situation about as well as morphine and it has the great advantage of not causing as prolonged intestinal stasis to be overcome later at the risk of a second hemorrhage. Adrenalin is still being recommended in this condition but experiments seem to indicate that it has no systemic action when administered by mouth.

In case of perforation the one justifiable course is operation. The prognosis will depend to a considerable extent on its early recognition.

Conclusions.—In a paper of this kind many things well known to the hearers must be stated for the sake of sequence.

There are three points that are intended to be emphasized.

First, The fact that typhoid in children is usually a mild disease should never be made an excuse for not recognizing and saving the severe cases.

Second, What the child will absorb out of its intestinal tract, not what the nurse can force into it, should be the sole determining factor in diet.

Third, A belief in therapeutic simplicity should not be made an excuse for drug ignorance and inactivity in typhoid fever or in any other disease of childhood.

113 Montague St.

HOW TO "MODIFY" THE BABY.

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"I have tried every milk modification, have tried every kind of food and the baby does not thrive." Is this a familiar quotation? Who has not used every variety of bottled tonic, every kind of stomachic and bitter appetizer without inducing an adult patient to take food? Have we not tried canned air and coal-tar products, heart stimulants and blood enrichers without success?

Have we not modified baby feedings to our own exhaustion? Is it not possible that we may modify the baby that it may be able to take and assimilate food appropriately prepared?

Rest. A baby may be neurasthenic, may have nervous dyspepsia, may not be able to retain its feedings, may not properly digest them, simply from lack of nerve rest. I have in mind such. They are the first children of young couples, with enormous number of friends, all of them inordinately fond of babies. Each one wishes to play with the baby, to wake it, make it smile, toss it, kiss it, pass it around, take it to ride, hold it up to see the horses, see it roll its eyes toward passing vehicles, see it take notice of children on roller skates and babies in carriages. The babies gaze in wide-eyed wonderment and the friends report favorably on the young couple's first baby. Daily receptions at unforeseen hours, repeated wakings from sleep are frequent. More than half of the callers are privileged persons, grandmother, sisters, friends from a distance. All have the best of reasons for seeing the baby, they can not be denied, refused. A mother may essay to spare the child, but she is not able to protect it. She is inexperienced and but half appreciates the necessity of rest or she is too weak to make a hard fight against her friends' importunities, and the grandmother's sarcasms. The latter insists that she woke and showed all her babies all she wished to and so the objections are overruled. The baby is victimized. One mother of an only child calmly informed me that her child was sent to her for her comfort and she accepted it as such. Further words were useless.

I have seen cases where the milk was the best, the modifications made in laboratory according to the most approved formulae, the milk fed at stated intervals. Strange to say the excellent feedings were not retained, were promptly thrown up, and the wasting of flesh began and continued. In one case it was necessary to keep the baby from its parents, to feed it in a dark room, lay it quietly down or hold it and gently rock it till digestion was well begun. In another case a child lived for months in a large room, seeing no one but the nurse, sleeping the day through on a balcony in the open air. In both of these cases absolute quiet was the only thing needed to enable the babies to digest their proper food. I mean by proper food most carefully modified milk feedings. The baby was modified in each case to fit the feeding.

Rest in a case of enterocolitis required the baby's being trundled slowly along a quiet suburban road in a tea cart. The owner of the outfit in his joy at the recovery of the baby exclaimed that I had ruined a pair of horses, spoiled a coachman and upset all discipline in the stable. He added, the baby slept, the nurse slept, the coachman went to sleep on the box, the horses went asleep, everything went to sleep, but the wheels. For hours every day this dull trundling quieted the baby, induced its first consecutive sleep, rested its nerves, enabled it to digest its feedings and begin convalescence. The baby recovered, the horses went lazy.

Nerve rest is worth considering in modifying a baby so that it may digest food.

Open Air. It might be well to couple this heading with the former. Rest in the open air, many hours in the open air, *loitering in the fresh air* for many quiet, restful, consecutive hours does wonders for digestion. Many of us remember the days of the bicycle furor and the tendency to overdo its useful advantages. Professional men rode when they should have rested, sprinted when they should have napped. One reason for the bicycle's rapid falling into disuse was that it led to overdoing, but much of that overdoing was because it did not afford nerve rest to the very persons who most needed it. The infant needs long consecutive hours of rest, as many as possible of the twenty-four hours and many or most of these hours should be spent in the open air. Infants in hospital wards often suffer from a noisy patient in the same ward.

At the Presbyterian Hospital, New York City, we have a roof ward, a steel shed in which at the time of writing 12 children, the youngest fifteen months, have been continuously in the open air, all day and all night, for more than four weeks. Rest in the open air continuously for three weeks has afforded an object-lesson seldom witnessed. The fifteen months' old child was brought to the hospital with a diagnosis of tubercular peritonitis, going to the surgical division for operation. It proved to be a case of malnutrition, inability to take and assimilate food. At the end of three weeks its capacity for taking food was prodigious, its appetite simply incredible. The color of the infant was brilliant, its skin and eyes clear and bright, its cheeks, nose and chin, bright rose color. In short, from being a limp, little, pot-bellied thing without color, it became the pride of the ward and the pet of the hospital. Two other cases in the same open air ward, being modified to taking food, were empyema. They made the speediest recoveries of all the cases during the winter. One case was pneumonia in a forlorn, misshapen, rachitic boy. He made a prompt recovery and developed a devastating appetite. None of the cases caught cold, all were greatly improved, all dveloped excellent appetites, all had colors resembling seafarers. Next to the extraordinary appetites the most striking result of the continuous living in the open air was the sound sleep. Not more than once or twice in all night was the nurse obliged to turn on the lights or perform any service for the children, twelve in number.

The object of this paper is to emphasize the necessity for a broader view in feeding infants and young children, to encourage toward efforts to modify the baby that it may be able to digest the food brought to it. Perpetual changing of prescriptions is not enough. It is well to select a safe food and modify the baby's ability to assimilate it. Do not forever accuse the food. It is often the baby's fault. Help the baby to have rest, open air living, consequent appetite, good assimilation. Consecutive days in uniform hot houses leads to loss of appetite in infants as much as in adults. The skin needs the influence of cool, fresh air, it needs change of temperature. Babies need rest, need protection from officious interruptions and over-entertainment.

Finally. The prescription for modifying the baby calls for several ingredients, but foremost of all, in importance, are nerve rest and open air.

❧

BATHING SCHOOL CHILDREN

A subject that must be given serious attention by the Public School boards is that of daily baths of dirty children in school. The recent investigation of school children to determine their physical condition reveals the fact that many of them have not been washed for months, that in some of the poorer quarters it was found that several of the children had their underclothes sewed on and that they were not to be removed until the end of the cold weather. The nauseating odor of a school room filled with dirty children is not to be borne in these days of cleanliness.

It is criminal to mix the dirty with the clean; the former, coming from homes rife with disease germs, have no right to bring contagion with them to the class room. They must be washed in school if not at home, and if necessary their clothing fumigated before they have a chance to infect others. As *American Medicine* so aptly says: "Let there be less soup and more soap in our charity."

EARACHE IN CHILDREN.

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So common and prominent is this symptom of aural disturbance in children that the lay mind has dignified it, as it has done with dropsy and with other equally obtrusive symptoms with reference to other organs, with the status of a distinct and separate disease. The practitioner of medicine has no such illusion, and it is his bounden duty at this stage of advancement of aural work to correct this and many other popular fallacies with regard to the ear and its diseases. For example, there is a very prevalent popular idea that a purulent discharge from the ear is something not to be very severely deprecated, and that our efforts need not be very urgently directed to secure its cessation, because should the aural discharge cease, it will almost certainly "break out somewhere else." It would be idle to enter into a discussion as to whether such an erroneous impression is gained from the failure of the physician to cure the discharge, and who takes up this apologetic attitude in self-imposed self-defense, or whether it has come from the observation of physician and layman that the onset of complications—always dangerous and sometimes fatal,—is frequently associated with a cessation or marked diminution of the aural discharge. Whatever be its origin it is more than time for the correction of this absurd idea, which could not, it is safe to say, be advanced with reference to any other organ of the body, with any possibility of credence. How is this correction to be made by the family physician, for in his hands this matter rests? Fortunately, there is one part of the ear for which the layman has the utmost respect, the drum-head, and his ideas as to the consequences of its rupture or partial destruction are just as foreboding as they are vague. If then, the family physician will assure the guardians of his little ear patients, that the discharge is coming through a hole in the drum, as it does in the vast majority of cases, their fears will be properly aroused, adequate treatment will be instituted and maintained, many a life will be saved, and many a child start out in life without the terrible handicap of defective hearing.

Earache is most commonly a symptom of acute inflammation of the middle ear, and will first be considered with reference to this condition. It may be stated that an acute otitis media will be discovered in almost 100 per cent. of the cases of children brought to us complaining of earache. The amount of earache complained of will depend upon the stage of the otitis and upon the age of the child. In infants and very young children there may be no complaint directly referable to the ear, but upon inquiry in these cases, we generally obtain a definite history of fretfulness, restlessness, inability to sleep or broken sleep. Even in very young infants the mother will frequently have noticed that the hand was at intervals raised to the affected ear, or that the child cried on manipulation of the affected ear. This latter symptom is partly to be explained by the absence or very rudimentary development of the bony canal in young infants, and partly by the dread of the child to have the parts handled. In older children and in adults, manipulation of the auricle in an acute otitis media causes no pain whatsoever.

The diagnosis of an acute otitis media will not very naturally, rest exclusively upon a more or less definite history of earache. Indeed it can safely be said that earache is by no means the most constant symptom of an acute otitis media in children. Elevation of temperature *is* undoubtedly the most common symptom. This ranges from 105 deg. or 106 deg. F. downwards, and on the ordinary physical examination of the child may be the only evidence discoverable of a pathological condition somewhere. It is easy to see that should the physician fail to make careful inspection of the ears with head-mirror and speculum, he will have failed completely to make a diagnosis, as indeed but too often happens. Having prescribed *for the fever,* he finds at a subsequent visit, that the temperature is down and that there is discharge from one or both ears; and then, and only then does he realize that he has had to deal with an acute otitis. The guardians of the patient, judging only as they must by the result, attribute to the physician and to his medicine a credit which neither deserves. It is gratifying to record the ever increasing number of general practitioners who, by exclusion, insist upon examination of the ears, and it is also gratifying to record how almost invariably their diagnosis by exclusion is justified on aural inspection.

This aural inspection by speculum and reflected light must in all cases, and whatever be the temperature or amount of earache, make the actual aural diagnosis. It is the absolute duty of the physician, who undertakes the general treatment of children, to fit himself by practice for this examination, or he must be prepared to call for competent assistance, when in his judgment and by a process of exclusion, an inspection of the ears is indicated. There is no middle way, nor can the physician be justified who, in the face of certain symptoms and after careful examination, submits his patient to an indefinite period of pain—relieved by spontaneous rupture of the drum-head, when other and better methods are at his command.

As stated earlier, the amount of earache will depend to some extent on the stage of the acute otitis media. This, again, will be determined by actual inspection and will be found to vary from a peripheral injection of the membrane with clear areas behind and in front of the malleus handle, to a deep and fiery redness with bulging of the drum and complete loss of all the landmarks.

Inspection of the drum-head in infants and young children is sometimes easy and sometimes very difficult. The child should be seated upon the knee of the nurse with the side of the face against her breast. In examination of the right ear, the nurse holds both of the patient's hands with her left hand and steadies the head with her right. During examination of the left ear, the child's right cheek is against the nurse's breast, the two hands are held by the nurse's right hand, while the head is steadied by the left. The speculum employed should be the largest available, and the canal must be manipulated with the speculum so as to obtain the best possible view of the fundus. This is usually obtained in children by drawing the auricle horizontally backwards or backwards and somewhat downwards.

It should not be forgotten in infants and very young children that the drum-head occupies a position that is more nearly horizontal than vertical, and that a bulging drum is apt to give, more or less the appearance of a bright red prolapse of the superior canal wall. In incision of such a drum, the knife must be carried inwards on the floor of the meatus, through the drum-head and then upwards and backwards parallel to the insertion of the membrane, through the uppermost bulging parts.

The treatment of the acute otitis media will depend upon the stage. In the earlier stages abortion may be hoped for, but in the presence of a red and bulging drum—where the inflammatory process has gone on to the stage of effusion, immediate free incision is urgently indicated. Subsequent treatment consists of repeated irrigations with a soft bulb or hard rubber piston syringe. The antiseptic employed is not important, but bichloride 1 :8000 at two hour intervals is as good as any.

Where abortion is tried, the patient should be put to bed, the diet restricted and the bowels moved by saline cathartic. To relieve the pain a hot water or a hot salt bag should be slipped under the pillow case, and the child made to lie with the affected ear resting upon it. Inspection at intervals of about twelve hours will determine the further procedure.

Practically all children suffering from otitis media have adenoids and the question of their removal during an acute otitic attack is a very frequent source of discussion. Should the ear examination reveal the indications for immediate incision of the membrane, nothing can be gained by removal of the adenoids. Indeed matters may be made worse by the addition of another source of infection in the naso-pharynx. Should, however, immediate incision be *not* imperative, much may be gained by a removal of the adenoids. The local blood-letting often results in the marked diminution of the aural inflammation and the cases go on to recovery without rupture of the membrane tympani. The parents should always be warned that the cases may go on to effusion and may require incision, *in spite of* and *not in consequence of* the removal of the adenoids.

The foregoing remarks have reference to the so-called idiopathic otitis media. Otitis media complicating the exanthemata in children requires special consideration. The symptoms lose their significance. Earache may not be complained of and the rise of temperature may not be observed in that of the preexisting scarlet fever, measles or other disease. Our only safeguard here, is the daily inspection of the drum-heads. This is the more urgently called for when we remember that this type of otitis media is marked by a rapid destruction of drum membrane and involvement and subsequent caries of the ossicles and bony tympanic walls. It is a matter of observation in septic cases that infection within the mastoid antrum is coincidental with the middle ear infection. Much good results from early recognition of the aural complication with immediatae incision of the drum membrane. It is the opinion of the writer that much more good will result when, in many of these cases, the mastoid antrum will be opened at an early stage. Not only will the deeper involvements be anticipated and prevented, but the adequate posterior drainage of the middle ear will result in the saving unimpaired or but little impaired of those structures which are essential to acute hearing.

Earache in children, although not so frequently as in adults, is sometimes due to a circumscribed external otitis, or furuncle. This is either primary or secondary. Primary furunculosis is rare in children because this condition is usually due to infection by scratching with matches, toothpicks or hairpins. Secondary furunculosis, or furunculosis in presence of an existing purulent discharge is by no means uncommon in children. The diagnosis is made by the swelling, pain or pressure over the furuncle and *pain on manipulation of the auricle and canal.* Free incision followed by irrigation will meet the requirements.

In a certain number of cases of children presented to us because of earache, no indication of acute inflammation either in the middle ear or in the external auditory meatus can be discovered on examination. The drum membranes are clear but retracted and may even present the appearance of changes within the middle ear, which would justify the diagnosis of a chronic catarrhal otitis media. There is no history of aural discharge, but the attacks of earache have occurred at intervals. On careful inquiry we find that a genuine earache preventing sleep is absent, that there is more or less tinnitus and that the hearing function is somewhat impaired. Inspection and digital examination will invariably in these cases reveal the presence of hypertrophied faucial and pharyngeal tonsils. Removal of these and subsequent inflation of the middle ear by Politzer's method will usually be followed by cessation of the pain and complete restoration of hearing.

Foreign bodies in the ear, so common with children, do not as a rule give rise to earache. Only when injudicious efforts at removal have brought about other conditions, do they cause pain.

Removals under favorable circumstances and in competent hands will readily suggest themselves as appropriate.

Earache in adults, is well known to be often attributable to caries of the teeth. This is not found to be the case in so large a proportion among children. It should, however, not be forgotten. Reference to the dentist, after exclusion of the ear and naso-pharynx by careful examination, is indicated.

Earache due to traumatic rupture of the tympanic membrane occasionally calls for examination at the hands of the physician. In these cases in children, rupture is most frequently due to condensation of air in the meatus caused by blows or slaps on the ear. As the interest here is generally medico-legal in character, these cases should be immediately referred to the aurist. When seen before secondary infection has taken place—which is the exception rather than the rule, the location and character of the opening in the drum membrane may be of material assistance in forming an opinion as to the probability of the injury and as to its nature. When purulent infection has taken place such a diagnosis is usually practically impossible.

616 Madison Avenue.

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Glasses for School Children (American Medicine, July, 1907.) The New York Board of Education has decided to request the Department of Health to make an expert examination of the eyes of all the children in the public schools of the city to determine the exact number for whom glasses ought to be provided. The committee to whom the resolution was referred said the estimate of 36,000 children needing glasses was too low. The report also stated that the examinations made were inadequate to determine the extent of myopia or to provide accurate data for the treatment of those afflicted.

THE USE OF CITRATE OF SODA AS AN ADDITION TO COW'S MILK IN THE INFANT DIET.*

By J. W. Van Derslice, M.D.,

PRESIDENT, CHICAGO PEDIATRIC SOCIETY.

The use of citrate of soda as an addition to cow's milk in the feeding of infants is demonstrated to be of distinct value in a certain range of clinical cases. The conditions may be embraced under the several headings. (1) For weaning a healthy infant. (2) For increasing the amount of milk taken in the twenty-four hours. (3) For correcting milk dyspepsia. (4) For the avoidance of scurvy. It is of value in the weaning of healthy infants in that the infant is capable of digesting unmodified cow's milk much sooner with little or no digestive disturbance, when for the first week or ten days citrate of soda is added to the milk in the proportion of one grain to the ounce of milk. In the weaning of normal infants at six or more months of age we begin by giving one or two feedings a day of plain cow's milk containing one grain of the citrate to the ounce. The number of feedings of cow's milk is increased each day and as soon as the diet consists wholly of the citrated milk, the amount of the citrate is gradually decreased to three quarters, then to one half a grain, then discontinued except at any time of stress, when the citrate is again given for a few days. When it is necessary to wean an infant during the first weeks of life, the milk is diluted with an equal quantity of water for a few days, then increased to two parts of milk and one of water. This is given for a few days, when whole milk is given. In cases where it is necessary to feed artificially from birth, it is possible to feed whole milk after the first two weeks. The infants fed from two weeks on with whole milk have all made a more than average weight gain and so far as we could determine a normal development. That there is any advantage in feeding so young infants whole milk, we are not willing to maintain, but that there is no disadvantage, we most fully believe. Wright advocates the feeding of all infants over two weeks of age whole milk. In France, where this method was early taken up, they are feeding whole milk from two weeks on. It is well to remember that in the feeding of these young infants whole milk we are feeding a food of the same caloric value as breast milk. Herein lies one of the advantages of this diet, in that we are able to give to very young infants a natural food of an energy quotient equal to mother's milk.

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*Read before the Association of the American Teachers of Diseases of Children, Atlantic City, June 3, 1907.

In children previously fed upon any of the proprietary foods, or upon any partially digested food, where the digestive organs are poorly developed, we rapidly develop the digestive organs by our gradual increase of the amount of milk given. In children previously fed on high percentage of starch where there is an intestinal catarrh and dilatation, or in children with a milk dyspepsia and impaired digestion, we can give a much higher proteid content than by any other method. In breast fed children with vomiting and curds persistently appearing in the stools, the administration of one or two grains of citrate after each nursing effects a disappearance of the symptoms.

As we are feeding a raw milk, there is no danger of scurvy.

In the use of this method of feeding we believe that we are feeding a natural food with less manipulation than by any other method known to us, and that the chemical change is of minor importance in its effect upon the nutritive value of the milk, as in the addition of citrate of soda, we add a salt found in mother's milk. The effect of this salt upon cow's milk is not to be construed to be the same as when the stronger alkalies are added, as here we have a chemical change in the calcium casein into sodium casein, which curds in fine curds upon the addition of hydrochloric acid and rennet. That this salt has such an effect upon the casein is easy of demonstration. Take five test tubes, into each of these put one ounce of cow's milk, to No. 1 add 5 drops of liquid rennet, to No. 2 add five drops of liquid rennet and five drops of 2 per cent. hydrochloric acid, to No. 3, No. 4, No. 5, add the rennet and the hydrochloric acid, to No. 3 add one grain of citrate of soda, to No. 4 add two grains of citrate of soda and to No. 5, five grains. Now if these be placed in a water bath, at a temperature of 40 deg. C. and coagulation allowed to take place it will be seen that No. 1 and No. 2 have a dense heavy curd which sinks to the bottom, that No. 3 has a fine curd which floats in the liquid, No. 4 has a still finer curd and in No. 5 there are fine flakes. By this test it is readily seen that there is a change in the casein curds, caused by the sodium citrate, and that the size of the curd is regulated by the amount of citrate used. We apply these findings clinically by adding the smallest amount of citrate that can be given the child without curds appearing in the stools. We believe by this method of feeding, we develop the digestive tract rationally and more rapidly than by any other method, as we increase the capability of the organ by giving the stomach its full quota of work to do without overtaxing its powers. There is an avoidance of all danger of under-feeding by the giving of a food equal in caloric value to breast milk. In children with a digestive disturbance, we first clear up any acute disorder and then putting the child upon an equal dilution of cow's milk and water and the addition of one grain of citrate of soda to the ounce of milk. This initial percentage of milk is increased the third day, if there are no curds appearing in the bowel movements, to two parts of milk and one of water. This last mixture is given only until it is evident the child can easily digest this percentage, when an increase to whole milk is made. If, after increasing the percentage of milk, curds appear in the stools, we do not increase the amount of the citrate, but rather decrease the percentage of milk for a few days, when again we try feeding the higher milk mixture, bearing in mind that it is not so much an increase in the food value as it is the developing of the powers of digestion we most desire. As soon as the child is digesting milk of the strength we desire to give, at its age, we gradually decrease the amount of citrate of soda. While experience has taught us that a good working basis to begin with is one grain of the citrate to the ounce of milk, this regardless of the dilution or the amount of milk used, there have been some few cases in which it was necessary to use a greater quantity of the salt. Other writers have recorded cases where five grains to the ounce were used. We have increased the citrate to two grains to the ounce of milk. In a child in whom the curds persist with the use of one grain to the ounce of milk when first put on this diet, we increase the citrate to two grains to the ounce. This amount is given until the curds disappear, when the citrate is decreased to one grain to the ounce. There is no increase made in the percentage of milk used until the child is capable of digesting the initial milk mixture with the addition of one grain to the ounce. When this can be done, as evidenced by the stools, and the condition of the child, the milk is increased. The dilutions of milk used are equal quantities of milk and water, two parts of milk and one of water, and whole milk. The milk used is commercial milk, not sterilized, except in cases where the milk is very doubtful quality, or in a few of the very hot days of summer. We do not use a citrate of soda addition to percentage modified milk as we can see no advantage in combining the two methods, but can see where the citrate might be used to advantage if one desired to use the latter method, and would suggest the use of one grain of citrate to each twenty-four grains of proteid in the mixture. The length of time it has been necessary to give the citrate has been quite variable. In one case it was necessary to persist in the use of the citrate until the child was sixteen months of age. In infants fed from birth by this method, we can usually omit the citrate at from six weeks to three months of age. In weaning breast-fed infants at six or seven months of age, we find it necessary to give the citrate only six to ten days. The period in which the citrate is used is governed largely by the previous diet. Where the child has had a proper dietary and the digestive organs are normally developed, it is needed but for a few days, but if the digestive functions are below par, we find it necessary to persist in the use of the citrate for a considerable time.

In some of these cases we find that constipation is a factor, and we also have cases where the mother persists in the use of the citrate because of the laxative effect upon the child. In the cases where the constipation was a factor, it usually has been where a low fat content was given and we have been able to control the tendency by a dram dose of olive oil at night. We have found in children fed by this method, a characteristic stool, which is a stool of normal color, homogeneous, being firm enough to hold its form on the diaper and free from fecal odor.

Our guides to the use of citrate are, the condition of the stools, the body weight, the mother's report of the condition of the child. One rule as to the amount of citrate to be given is, if the indigestion persists, increase the citrate, even though there is a good weight increase. A fat or sugar indigestion may continue for some time after being placed upon this diet.

Some of the advantages of this method of feeding are: It renders the curd of cow's milk finer and more digestible. It is simple and cheap. It is convenient and easily administered. It allows of giving milk more concentrated, with no danger of underfeeding. It is given as a medicine, gaining the confidence of the mother, and whatever her intellectual capabilities, or her limitations in the use of the language, it is usually possible to teach her to put one teaspoonful of the medicine into each feeding.

Citrate of soda is freely soluble, so in prescribing the salt, we prescribe as many grains to the dram as we are giving ounces of milk to the child, giving a mixture large enough for a week. For example, we prescribe for an infant taking Milk ℥ IV water ℥ II Sodium citrate gr. IV six feedings a day.

Sodium citrate	ʒ III
Chloroform water	m X
Aqua dest.	℥ VI

M. Sig. One teaspoonful to be put into each feeding. The chloroform water is added because of the danger of a fungoid growth as in dilute bromide solutions.

In the use of this method of feeding we believe it is an aid in the feeding of children, and after three years' experience, recommend it as the most satisfactory method with which we are acquainted.

THE RADICAL CURE OF INGUINAL HERNIA IN INFANTS AND YOUNG CHILDREN. SECOND PAPER.

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In the *Philadelphia Medical Journal* for May 2, 1903, I published a short paper on the radical cure of inguinal hernia in young subjects wherein I reported seven cases of Bassini's operation on male infants varying in age from five months to 21 months. The conclusions arrived at were as follows: "(1) Experience has demonstrated the innocuity of radical operation for hernia in infants. (2) The operation is indicated in all cases of strangulation, in all cases in which the contents of the sac cannot be retained by a truss, in every case in which irritation of the skin is produced by the mechanical appliance, and in children of the poor who cannot receive the necessary and proper attention at their homes." This paper referred to was in reality a plea for operative interference, but in the present article I wish to consider more fully the various technics employed and their applicability to young children and infants.

The testicle, which is primarily seated in the abdomen, comes down through the anterior abdominal wall into the scrotum along a canal lined by a prolongation of the peritoneum, so that it may be said that at a given moment a preformed sac exists which is well arranged to receive the intestine as well, and for this reason the frequency of congenital inguinal hernia may be readily understood. In the large majority of cases the hernia will make its appearance during the first few days or months following birth, but it may not occur until much later, for example, in young boys 10 or 12 years old, in which case it is termed congenital simply on account of its intimate relationship with the testicle, which shows that the hernia has arisen in the vagino-peritoneal canal, this having remained patent, and is in direct communication with the abdominal cavity. Now since the non-obliteration of the vagino-peritoneal canal is the principal cause of congenital inguinal hernia, it has given rise to a number of researches in this respect. Out of a total of 62 children under the age of one month, Feré found the canal completely obliterated on both sides in only 34. Of 70 newly-born infants examined by Camper, in 34 the vagino-peritoneal canal was patent on both sides, while in 14 it was patent on the right and in 8 on the left side. Sachs observed that obliteration had taken place in 41 per cent. of children examined during the first four months of life and in 66 per cent. of those examined later on, from the fifth to the twelfth month. Zuckerkandl found the vagino-peritoneal canal patent during the first three months in 37 cases, and out of this total, obliteration was absent on both sides in 20, 12 times on the right and 8 times on the left side. The persistency of the vagino-peritoneal canal is met with more commonly on the right than on the left, which explains the greater frequency of congenital inguinal hernia on the right side. Out of a total of 424 congenital inguinal herniæ, Berger found 253 on the right, 119 on the left, and 52 on both sides, while among 120 cases of this kind, Kirmisson found 60 on the right, 48 on the left, and 12 on both sides. All surgeons seem to agree that inguinal hernia occurs very much more frequently in males, and Kirmisson observed 120 instances in boys and only 12 in girls. Feré's statistics show 22 boys and 5 girls, while Sachs has met with only 3 inguinal herniæ in girls and 100 in boys. The production of congenital inguinal hernia is intimately connected with the descent of the testicle. This may be complete, while in other cases it remains incomplete, from which fact is derived the classification of congenital hernia into simple inguinal hernia and hernia complicated with ectopia of the testicle.

We will now consider the six varieties of hernia that may be met with in young children, the first being complete vaginal hernia. This is characterized by the persistency of the entire vagino-peritoneal canal, allowing the intestine to enter into the cavity of the scrotum in direct contact with the testicle. The neck of the sac is usually formed by a narrowing in the canal, corresponding to the internal inguinal ring. The cord is placed below and somewhat behind the hernia in the canal, while in the scrotum it is found directly behind or somewhat within. The second form is funicular vaginal hernia, and is characterized by the presence of a patent vagino-peritoneal canal, with obliteration of the serous membrane covering the testicle, so that a hernia coming down in this canal will be arrested in its progress by this obliteration and consequently is not in contact with the testicle.

The third type represents congenital hernia with undescended testicle, and is characterized by the production of a hernia with a testicle in ectopia. The fourth variety, inguinal-interstitial hernia, is distinguished by the presence of the intestine in the inguinal canal and the testicle in the sac. The external ring, which holds back the testicle and the gut, is extremely narrow, while the inguinal canal itself may be enormously dilated. Properitoneal inguinal hernia represents the fifth type, and here the rupture may come through the external inguinal ring and penetrate as far as the scrotum, while behind its inguinal prolongation is to be found a second one situated in front of the peritoneum, between it and the internal ring. The sixth and last type of congenital hernia is the so-called encysted hernia of the vaginal tunic. In this variety the sac projects into the cavity of the vaginal membrane which surrounds it almost completely, although no communication exists between them.

Since the radical cure of inguinal hernia in children has become current, the various operative technics have multiplied, but it may be said that they all have this double end, namely, the suppression of the hernia and the prevention of a recurrence. A careful study of the various procedures will show whether this end is attained, and in considering them we should examine those operations applicable for the radical cure of inguinal hernia in children and infants and those which have been employed in adults. The various operative methods which have been applied only to children are most dissimilar. In some the external ring is alone dealt with, while in others it is the internal ring, but they all present this particular peculiarity, namely, of being less complex and more simple in execution than the procedures employed in the adult. The various surgeons who have advocated them insist more especially on the points by which they have been guided in simplifying the operation, viz: that in children the muscular layers are in excellent condition, the tendency to spontaneous obliteration of the canal, and the very exceptional recurrence when one has simply done away with or obliterated the sac, which, generally speaking, is very supple and free from adhesions. From this arises the classification of operative procedures into those where the external ring is closed and those where the internal ring is closed.

Of the former technics we have the following: Kirmisson's operation is as follows: The obliquity of the canal exists and it is especially the external ring which presents an abnormal size while, on the other hand, the neck of the sac is supple and thin, and can be drawn down with the greatest ease, so that without slitting up the inguinal canal in its entire length, a ligature may be placed very high up on the peritoneum. For this reason Kirmisson believes that it is quite sufficient to apply the ligature as high as possible and then to narrow the external ring by suturing the pillars. The results that he has obtained in infants have appeared to him quite as good as the more complicated methods. He proceeds as follows: An incision from 5 to 6 centimeters in length is made over the inguinal canal, extending from above the external ring and ending at the apex of the scrotum. By this incision the aponeurosis of the external oblique is exposed. The fibrous sheath, in the midst of which is found the sac, being split open, the former is picked up with forceps and drawn forward. When the sac has been freed, gentle traction is made so as to bring it down and allow one to place the ligature as high as possible. After this has been done the pillars are sutured with silk, and the operation is completed by closure of the cutaneous incision with silkworm gut.

Félizet's procedure consists in a transverse incision of only a few centimeters length over the apex of the scrotum, and is made here on account of the very scant blood supply. The sac is dissected out, ligated and excised as high up as possible, while the operation is completed by a suture *en masse* of the external inguinal ring. This authority advises the use of very fine metallic sutures for the pillars, and has been very well pleased with his results. Froelich makes an incision 5 centimeters in length over the external ring, and then dissects out the neck of the sac without opening it, after the contents have been reduced into the abdomen. When the neck of the sac is freed it is caught in clamps and drawn outward. The left index finger is then introduced into the ring in order to guide the needle with the sutures, as well as to protect the cord, which can be felt perfectly against the lower wall of the ring. Obliteration of the peritoneal neck is made by passing a suture including both pillars and going through the neck. No drainage is employed. Russell has maintained that it is quite sufficient to remove the sac in children, believing that the suture of the abdominal wall or the pillars is useless, since the hernia is due to the presence of a congenital sac, which, in the large majority of cases, is a non-obliterated portion of the inguino-peritoneal process.

We now come to the consideration of an operative procedure having for its aim the closing of the internal ring, which has been performed 25 times by Gaudier. Essentially it consists in a high external incision, which allows the exposure of the internal inguinal ring, and then the sac having been resected and the stump properly treated, the internal ring is alone closed without splitting open the inguinal canal and without dealing with the external ring. The internal ring represents a slit whose borders are spread apart by the passage of the cord or the round ligament between them. The internal border is projecting and frequently represents a crescent with the concavity looking outwards, the points becoming lost insensibly below and downwards. The external border is not well marked. The borders are composed of a fibrous process having a variable importance. Cooper asserted that the external border was the strongest, while Cloquet taught the contrary. Others have thought that both these authorities were correct, the question merely depending upon the particular subject examined. When the fibrous tract of the iliopubic band extends as far as the internal ring, the external border will be much the stronger, and this is easily ascertained by introducing the finger through the opening; but generally this band remains below, so that the internal border, which is almost always reinforced by a few vertical fibers, will be found stronger than the external. This opening measures from 12 to 15 millimeters in length, and is situated 15 millimeters above the crural arch according to Tillaux, while Blaise has found it higher up, usually from 18 to 20 millimeters, taking as a landmark the upper part of the cord. According to Cloquet the internal border is found 50 millimeters from the pubic spine in the male and 52 millimeters in the female.

The technic is briefly as follows: The first landmark is the middle of the femoral arch, and the incision should be made about a centimeter above and parallel to it, starting at about 3 centimeters outside the landmark and extending beyond it for only half a centimeter. The cellular tissue being next cut through, the vessels are tied off and the aponeurosis of the external oblique is exposed and incised, after which the femoral arch is sought for.

This is facilitated by the presence of the genital branch of the great abdomino-genital nerve on the external oblique. The internal oblique and the transversalis are next incised, and inwardly, at the bottom of the wound, the falciform fold of the transversalis fascia is seen, while outwardly will be found the elements of the cord and the hernia sac united in a common sheath. It is at this point that dissection of the sac is proceeded with. Division of the elements of the cord at the internal orifice renders dissection easier, because they are reflected downwards over the edge of the peritoneal opening, while the sac takes on an upward oblique direction. An incision made in the fibrous sheath covering the sac and the cord allows one to quite easily isolate the former by searching as high up as possible, far away from the internal ring and near to the point of formation of the sac. All this should be carried out with great care, because the sac is thin and easily torn.

The dissection is carried upward as far as the commencement of the vagino-peritoneal canal, and is then continued downwards after having caught up the borders of the ring with clamps which act as guides. Before continuing the dissection as far down as possible, both the cord and testicles are drawn up in the wound out of the inguinal canal, and then the sac isolated and ligated in the neighborhood of the testicle, after which the serous sac covering the organ is closed. The intermediary segment of the vagino-peritoneal canal, comprised between the internal ring and the testicle, is then resected.

I have already referred to ligation of the lower part of the sac, which is accomplished according to the usual way, but the mode of closing the peritoneum above should be given in some little detail. The originator of this method does not simply apply a ligature to the sac as in most of the procedures advised, and he points out that the various ways of closing the peritoneal cavity are defective, inasmuch as they produce an infundi-buliform condition of the peritoneum. Now, this defect can be avoided by suturing the circular peritoneal opening which results from the resection of the sac in such a way as to transform it into a transverse line. The sutures being linear, no trace of an infundibulum occurs, consequently there is no starting point for a new hernia.

The internal ring now remains to be closed and represents a very important part of the operation. The fascia transversalis is caught up and brought in contact with the femoral arch, thus closing the internal ring, while a careful running suture unites the elements of the cord, the internal oblique and the transversalis with the femoral arch. The aponeurosis of the external oblique is sutured over this, so that it reinforces the wall, and the operation is completed by closure of the skin incision with or without drainage.

We now come to the consideration of the operative procedures used in the adult and which have also been applied to children. I shall be content with a rapid enumeration, because they present nothing special, and the only thing that need be said is that their intricacy may be still further enhanced in the child on account of the thinness of the walls of the inguinal canal and the friability of the sac. The procedure of Lucas-Championnière consists in making a long incision, starting at the top of the scrotum at a point directly above the peritoneal opening of the inguinal canal. The aponeurosis of the external oblique is exposed, opened up between two clamps, and then the sac is sought for in the midst of the elements of the cord. When it has been exposed it is opened and dissected out, the dissection being carried far above the neck of the sac until the subperitoneal fat is seen. When the pedicle of the sac has been carefully freed and closed, a double catgut strand is passed and a chain ligature made. The ligature is cut and the stump is immediately reduced into the abdomen. The anterior wall of the inguinal canal is then repaired by overlapping the borders of the aponeurosis of the external oblique by a series of U-shaped catgut sutures, which are reinforced by a few sutures above and below, after which the skin is closed with silkworm gut.

Barker's technic consists in isolating the sac, forming a pedicle of it, and including this in a very tightly tied ligature, after which the sac is removed. Then passing a needle in which one of the ends of the ligature on the pedicle is inserted, it is carried into the subperitoneal fat and through the abdominal wall. The same is done with the other end of the ligature, which is carried through the abdominal wall at another point, and then both ends are tightened in order to pucker up the sac, which is pulled upwards and held in place, when the two ends of the ligature are tied. The pedicle is thus fixed over the internal ring and projects into it, so that filling it up, it prevents the intestine from entering into it. The operation is completed by uniting the walls of the inguinal canal by a few sutures.

Ball's procedure consists in making a torsion of the sac, after being assured that it is empty. Seizing it with a pair of clamps it is turned upon its axis, usually four or five times being enough, and then a heavy ligature is placed around the neck. Two sutures are then passed through it, embracing the pillars, which maintain the torsion of the pedicle, the body of which is removed just below the ligature. The tension of the peritoneum produced by the torsion is, according to the author of this procedure, sufficient to efface any depression in the peritoneum above the ring.

Instead of removing the sac after isolating it, Macewen puckers it by passing from below upwards to the neck a ligature, which is also brought from behind forwards through the aponeurosis of the external oblique, to which it is ligated. After this has been done, the inguinal canal is resected, giving to it its oblique direction. A ligature whose loop is in the subperitoneal fat is carried through the aponeurosis of the transversalis just internal to the internal ring, and then the two ends of the ligature are passed into the inguinal canal in front of the cord. Both ends of the ligature are brought through from behind the external oblique forwards, a little above its insertion on the arch of Fallopius, and are tied at this point.

Of Bassini's operation I shall say nothing, as the technic is too well known, but in Mugnai's procedure the muscles and aponeurosis are dissected just as in Bassini's operation, but the cord, instead of being laid over them, is pushed behind them in the midst of the properitoneal fat, between the fascia transversalis and the parietal peritoneum. The three layers are then sutured to the posterior border of the arch of Fallopius, while the aponeurosis of the external oblique is sutured to its anterior border, so that the cord passes out through an opening left for it. Aguilard has taken up the latter technic, and the principal idea of the operation which he performs is to make over the abdominal wall in such a way that it will be sufficiently resistant against visceral impulsion, and in order to accomplish this he does away with the internal ring and the intermuscular portion of the inguinal canal by fixing the cord to the parietal peritoneum and narrowing the external ring down to its normal dimensions.

Contrary to the operations which have just been described, Halsted brings the cord out through the upper angle of the incision—in other words, through the thickness of the abdominal wall from behind forwards in the region of the internal ring—and then the entire inguinal canal is closed behind it with sutures. The aponeurosis of the external oblique, which has been incised so as to bring the cord outside, and the external ring are then sutured, leaving the cord running under the integument from the upper angle of the incision down to the scrotum.

Broca makes an oblique incision of the skin over the inguinal canal without reaching the scrotum, and then the aponeurosis of the external oblique is incised to the extent of 3 or 4 centimeters. The sac is thus exposed along with the cord or the round ligament. In the female the sac and round ligament are raised up, and by traction the cul-de-sac which penetrates the labium majus is pulled out, and after this has been done the epigastric artery is distinctly seen, at which point the sac is tied off, having previously been opened in order to see that no gut or omentum is caught. It is also pulled outward as far as possible so as to place the ligature high up on the peritoneum within the abdomen. In the male the cord is pulled up, and then the posterior wall of the canal is exposed, likewise the epigastric artery. The sac is then isolated, and if it is looked for at the base of the cord in the beginning, it will always be found. The dissection is carried up until the subperitoneal fat is exposed and then the bladder can be seen. To close the canal three or four sutures are necessary, including the entire thickness of the wall and passing out in front of the cord. Suture of the skin without drainage completes the operation.

Kocher does not incise the anterior wall of the canal, and when the sac has been freed, a small incision is made in the aponeurosis of the external oblique just within the internal ring. Through this opening he introduces a pair of clamps with which the sac is caught and brought through the small incision. It is then sutured in this position with a ligature inserted through the pedicle. Le Dentu first isolates the sac, as is done in Bassini's operation, and then treats it as in Kocher's operation, that is to say, a small incision parallel to the long axis of the inguinal canal is made in the external oblique, just above the level of the internal ring, through which a pair of clamps is introduced down along the inguinal canal. The sac is then grasped and is pulled completely through the small incision. The sac is next put on the stretch and sutured by a few points. Now, without splitting the aponeurosis of the external oblique, the finger is introduced into the canal to be used as a guide, and a large U-shaped suture is inserted perpendicularly. He thus plugs the inguinal canal by tissues, and, in order to hold these in place, he catches up the apex in all the sutures which are used for closing the skin incision.

Having now considered the various technics, I come to my conclusions, namely, that in cases of simple hernia with a descended testicle, one may resort to simple procedures without opening the inguinal canal, but always resecting the sac as high up as possible. All the methods employed for the adult may be used in the child, but, according to my way of thinking, Bassini's operation is by far the best, especially when the testicle is undescended. Since my paper referred to at the beginning of this article, I have had more ample experience to demonstrate its utility in infants and young children, and I must confess that I am unable to see how anything can be more simple, rapid and perfect if care be taken in carrying out a perfectly aseptic technic. By the use of proper dressings the incision will not be soiled by the urine, and a radical cure may be expected.

PEDIATRICS

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TUBERCULIN

The evidence that pulmonary tuberculosis in young children is frequently secondary to tuberculous disease of the bronchial glands seems conclusive (Weigert, Heubner, and others). While the disease is confined to the glands, the chance that nature will succeed in limiting the infection to its original location is reasonably good. Here the capsule forms a primary line of defense, and the irritating toxines which are carried off by the efferent vessels are very shortly responsible for a sufficient inflammatory reaction in these vessels to completely obliterate them. Confined to the gland itself, the toxines stimulate an intense reaction in the capsule and periglandular tissues, and are thus instrumental in constructing their own tomb. When the infection is not confined to the glands the result is quite different. In the lung, for instance, the circulation of the blood and lymph of the child is so free and active that the toxines are carried off and dissipated as fast as they are formed, and the local process proceeds, disturbed by little or no inflammatory protest. The result is a high degree of toxemia and a rapid course of the disease, almost invariably leading to a fatal issue.

As the prognosis of tuberculous adenitis, wherever situated, is so much better than the prognosis of the same disease when the infection has extended to the lungs, the peritoneum, or the whole organism, the importance of the early recognition of this condition is evident, that every effort may be made to restrict the infection to the safer location.

The diagnosis of bronchial adenitis in children is often a matter of great difficulty, and it is here that turberculin finds its greatest usefulness. Such, at least, is the conclusion of Engel, who reviews the subject at some length in a recent issue of the *Beiträge zur Klinik der Tuberculose* (Vol. VII, Part 3, 1907). The reaction in children is usually very pronounced, and Schick (*Jahrb. f. Kinderheilk.*, 1905) has drawn attention to the fact that the more recent the infection the more severe will be the reaction. There may be an intense local reaction at the point of injection. According to von Pirquet, 88 per cent. of tuberculous children under two years of age will develop a small red papule at the site of injection, which will last about a week. This sign does not appear if the child is very cachectic or is suffering from miliary tuberculosis. Older children are said to show this reaction whether they are tuberculous or not.

As a therapeutic agent the value of tuberculin in tuberculosis of the young is still a matter of uncertainty. Engel reports one instance which came under his observation in which the use of tuberculin appeared to result in a very decided tendency to localization of the infection in the lungs of a boy of eighteen months. Such a tendency is seldom seen to a like extent in children of this age. On the other hand, tuberculin may hasten the softening of tuberculous foci in young patients and in this way facilitate the dissemination of the bacilli. Since the method of administering tuberculin as a therapeutic agent has been so modified that injurious effects are seldom seen, it is being used much more extensively, and undoubtedly we shall soon be in possession of figures which will enable us to judge much more intelligently of its value when applied to children.

ABSTRACTS

"Tuberculous Disease of the Spine in Children."—Olive Elgood (British Journal of Children's Diseases, June, 1907) writes this thesis on the basis of 28 cases of spinal disease in children under her care. She gives two pathological types: (a) the localized soft caseous deposit, or the sequestrum, in the interior of the bone; (b) the primary superficial caries. The first is the commoner in children. The disease starts in the body of the vertebra and spreads toward the surface. This necessitates a certain amount of bone destruction, and the weight of the bodies above, pressing upon the softened bone below, produces a tilting backward of the spine of the uppermost diseased vertebra and causes the typical angular curvature.

On reaching the surface the disease may produce: (a) a secondary superficial caries, destroying parts of the intervertebral discs; (b) or a localized abscess may form, surrounding the spot where the caseous deposit has reached the surface.

When treatment effects a cure the inflammatory tissue organizes into fibrous tissue and then into bone.

Etiology.—Elgood considers hip disease commoner in children than spinal caries. The tendency for the spinal form to follow injury is less than in hip disease. Spinal caries is commoner in boys than girls, whose resistive power to the bacterial invasions of bones seems to be breater than that of boys.

Clinical Signs and Diagnosis.—Classification: (1) early cases before curvature, only diagnosed by the presence of rigidity of the spine; (2) cases with spinal deformity, but without complication; (3) cases with or without deformity, but with complication (a) abscess; (b) some concomitant tuberculous trouble; (c) sepsis; (d) compression of spinal cord. In the first class, determining the opsonic index may help to make a diagnosis, an index above 1.2 and below .8 indicating tuberculous disease. Rickets and hysteria may sometimes be mistaken for this disease.

Class II. is the commonest. The curvature is most frequent in the lower dorsal region, next in the upper dorsal and lower cervical, but is rare in the upper cervical and lumbar regions.

Class III. (a) Localized abscess pointing over the seat of disease is common in children. (b) Some concomitant tuberculous lesion. The usual site is in the lungs, and the pulmonary condition may be independent of, or secondary to, the spinal disease. The next commonest seat is in the glands, where the infection may be secondary, through the blood, or direct, from the primary focus. Concomitant bone and joint infections often occur, the commonest site being the hip. Sepsis accompanying tuberculosis is an important agent in maintaining and spreading the disease. Pressure on the spinal cord causes paraplegia, of which caries is the commonest cause in children. It may be the first sign to appear.

Treatment.—(a) By conservative methods. (b) By operative procedures (1) partial, simply to remove pus; (2) radical, to remove the disease; (3) in the later stages, to remove deformity. (c) Vaccine treatment. Conservative treatment consists mainly of rest and immobilization. The patient is kept supine six weeks after the last complaint of pain. Then a Sayre's plaster jacket is applied. Operation for removal of tuberculous pus must be done under the strictest asepsis, as these wounds heal with difficulty. The radical operation for removal of the disease is that of laminectomy, a dangerous and generally unjustifiable procedure. Vaccine treatment—Elgood recommends the use, in some cases, of tuberculous opsonins, according to Wright's method, sometimes combined with mild surgical measures.

HERMAN T. RADIN.

Erroneous Interpretation of a Physical Condition of the Chest in Children.—NEUMANN (N. Y. Med. Journ.) describes a condition of dulness and bronchial breathing at the apex of the right lung, very rarely of the left, with prolonged expiration, but without râles, which has often led to a diagnosis of pulmonary trouble. He ascribes these physical signs rather to an enlargement of the bronchial lymphatic glands, particularly those which extend from the hilus of the lung to the bifurcation of the trachea, and when there is also mediastinal dulness, to swollen mediastinal lymphatic glands. The condition of healed tuberculous processes in the lungs which may produce the physical signs of dulness and bronchial breathing without râles, may be said not to exist in children. The swelling of the bronchial glands is usually tuberculous in its nature.—Canadian Journal of Medicine and Surgery.

At the fifty-eighth annual session of the American Medical Association, held at Atlantic City, June, 1907, S. Mac Cuen Smith, as chairman of the section on Laryngology and Otology, chose as the topic of his address "Specialism in Its Relation to General Medicine." He delivered a chronological narrative, rich in historical detail, educational in every respect, and affirming the increased necessity for specialism. Whilst acknowledging the vast unknown, unlimited field that lies awaiting the delvers, we feel that there is too great a tendency at present to rush precipitately and unprepared into specialism, thus destroying much usefulness that might have been developed in general practice.

Primarily in modern days the specialist is an evolution of the general practitioner, one who stopped in the hey-day of the routine to follow what seemed to be an ignis-fatuus, and after many stumblings and wallowings, found the tangible within his grasp.

All true physicians are investigators, but some possess this quality intuitively, a natural stubbornness, a doggedness for research, and these men have placed medicine upon the scientific basis that she occupies to-day and justly deserve the name of specialists.

Devoting a few years to some special subject and then embarking into restricted practice is not specialism—if so, it is a misnomer.

One must have a broad experience in general medicine before he is prepared to enter the lists of specialism. A specialist is simply one who is more advanced in some one department of medicine than the general practitioner, but he must be his equal in all others. Pre-eminently must he be a diagnostician, and thoroughly familiar with etiology. His candle rays are converging ones. He who can focus his knowledge and produce the sharp print is indeed the specialist, be his profession whatever it may. The practitioner of twenty-five years' experience is too apt to look with a chary eye upon the specialist and not inclined to seek his services until perhaps too late. The young doctor of the day may be better equipped with education, a book worm, who can discourse eloquently, but he does not seem to possess the observation, the self-reliance, the versatility of the practitioner of the past, and to him the specialist is a necessity in his every-day work.

It is claimed that the future wiii bring the passing of the general practitioner. I do not believe that the laity will ever become more expert in diagnosis than the family physician.

The general practitioner is the doughty soldier of the ranks; the specialist is the tactician. Which offers the greatest opportunities, specialism or general medicine? We must again fall back upon our premise, that the former is an evolution of the latter, and that success in either is dependent upon the knowledge and qualifications of the seeker.

BALDWIN G. COOKE.

A Résumé of the Use of Antitoxine.—EDWIN ROSENTHAL (The Monthly Cyclopædia of Practical Medicine, July, 1907). The writer is afraid that we are permitting the antitoxin to "drift into the speculative class again, or to become neglected or even entirely disregarded." He assumes that the promises made by Behring, Roux, Yersin, Aronson, Ehrlich, Bokay, Baginsky and others have remained undisturbed and even if so, the fundamental rules have not been forgotten, so there should be no high mortality record. There should be no epidemic and a death, an exception. A failure to make a diagnosis is due to the laziness or neglect of the physician. Should there be the slightest suspicion of diphtheria, antitoxin should at once be used.

The rules as given by the originators are still the only safe ones to follow, to wit: begin with the initial dose; the second dose double the first, the third dose double the second dose and so on. The author has followed this method and has only a mortality of 1 or 2 per cent. This includes all cases.

One must remember that antitoxin is the specific for diphtheria and nothing more. It cures diphtheria but does not cure its results. If used early enough, however, it modifies the infection so that there are little or no after-effects.

It should be a rule not to use antitoxin after the fifth day of the infection, or when the patient suffers from toxemia or septicemia, if there be reinfection, or in a laryngeal variety where infection is slight, or again, where the patient though sick five or six days, shows no blood-alteration, the antitoxin should always be given.

Radiotherapy in Chronic Adenitis.—ALBERT ROBIN (La Clinique Infantile, July 15, 1907.) Albert Robin, in a communication to the Society for the Scientific Study of Tuberculosis, warmly recommends radiotherapy as the method of choice in the treatment of the chronic adenitis so frequently seen in children. The treatment should be given only by one skilled in the use of the rays. The end to be attained is to cause as much absorption of the rays as possible, while maintaining the integrity of the skin. This is secured by giving the treatments at sufficiently long intervals—say, eight days between the first and second *seances*, twelve between the second and the third, and fifteen days between the others. The duration of the exposure will vary with circumstances. After a time the growth starts to diminish in size, while the symptoms of compression, the neuralgias and the dyspnoeic phenomena disappear. One must allow seven or eight weeks before an appreciable effect will be noticed. If, after double this period, there is nothing accomplished, treatment should be changed. Besides its local action, radiotherapy produces an improvement in the general health. In a few cases Robin noticed a diminution in the number of white blood corpuscles and of large mononuclears. He claims excellent results from the rays, but again recommends the greatest care in their use, on account of the accidents they are liable to produce.

HERMAN T. RADIN.

Thyroid Insufficiency.—LEOPOLD LEVI and HENRI DE ROTHSCHILD (Revue d'Hygiene et de Medecine Infantiles, May, June, 1907) write this interesting study of "Thyroid Insufficiency," based on an analysis of eight cases of incomplete myxedema. Many of the classical symptoms of myxedema are present—the infiltration of the skin, pseudo-lipomata, the retarded development of the limbs, the scanty hair, subnormal temperature, constipation, headache, etc. The myxedema is called incomplete, because often the children are not idiotic, or even backward. Nervous conditions are marked, they have chilly sensations and frequently numbness of the fingers. Arthritis, or at least pain the joints, is common. There is increased arterial tension in some cases. These patients are particularly liable to auto-intoxications, and their resistive power in general is slight. There is a remarkable tendency for a condition of "hypothyroidism" to occur in families, although in widely differing degrees in the different members of the same family. The authors lay stress on one family characteristic—the "*signe de sourcil,*" or the "eyebrow sign"—a thinning out of the eyebrows at the outer end. Treatment with increasing doses of thyroid extract, or with the fresh gland invariably produced a rapid amelioration of the symptoms.

HERMAN T. RADIN.

Causes of Backwardness in School Children.—SCHLESINGER (Archiv f. Kinderheilkunde, Stuttgart) has made a special study of 138 children in the special school at Strasburg for children who are unable to keep up with the lowest classes in the grammar schools. He finds by study of the individual cases that the defective condition is, as a rule, the result of injurious influences acting on a central nervous system already suffering from an inherited weakness. The most serious conditions are observed in children in whom several of these injurious influences had co-operated, even when the hereditary taint was slight. His statistics show that these backward children form 1.1 per cent. of the total number of school children, and that boys are in the majority. In 13 cases there had been severe injuries of the head; in 28, convulsions in infancy, epilepsy, chorea or infantile paralysis, and in 20, severe headaches. Drunkenness in the parents was noted in only 30 cases; long sickness during infancy in 52, and exclusively artificial feeding in 55, measles in 76, whooping-cough in 40, diphtheria in 22, and scarlet fever in 10. He urges that these backward children should be given more opportunities for bathing, free meals, country schools, etc. They should have the benefit of everything of the kind, and the medical inspector of a school for backward children should be empowered to watch over the children and to treat them as occasion arises if he finds that the parents do not follow his recommendations in regard to medical advice. As these children are generally of the class in which the parents are unable to pay for a physician's care of the children, no one will lose pecuniarily by such a course, while the children would benefit immeasurably by constant medical oversight and treatment as indicated.—Journal of A. M. A.

Serous Mastoiditis.—Courtade (Le Progres Medical, July 13, 1907) writes on "Serous Mastoiditis," and reports a case. In certain acute suppurative middle ear catarrhs the mastoid process participates in the inflammation, and becomes filled with a sero-mucous fluid. This serous mastoiditis presents all the objective and subjective symptoms of suppurative mastoiditis, including cerebral symptoms, so that radical operation may be advised. The local symptoms may perhaps be less marked in the serous than the suppurative form. All this symptom-complex disappears when the fluid is evacuated, either spontaneously or by the compression of air in the auditory canal.

Herman T. Radin.

Buttermilk Feeding.—H. C. Carpenter (Jour. of the Am. Med. Assoc., May 11, 1907). Twelve cases of babies with infantile atrophy, gastro-enteritis, etc., are reported by the writer, in whom he had generally good results from the use of the following mixture: Buttermilk, 1 qt.; wheat flour, 3 1-3 teaspoonfuls; granulated sugar, 15 teaspoonfuls. The ingredients were carefully mixed, heated up to the boiling point but not boiled, and then rapidly cooled and kept till used. The cases were not selected as likely to do well, but in every case regular milk mixtures had been tried and failed before the buttermilk was begun. The ages ranged from one to fifteen months; the average gain in weight during the use of buttermilk was eight ounces a week. The author remarks the advantage of cheapness in the buttermilk feeding, and believes it a most excellent food for infants suffering from intestinal indigestion, enteritis, and marasmus. No unpleasant effects were observed from its use, children almost invariably taking it well. A few, when first put on the diet, vomited slightly, but with one exception this ceased in a day or two. The point the writer especially emphasizes is that the success is not so much due to the absence of fat as to the great ease with which the proteid of buttermilk is digested. He has observed this in almost every case. Several of the infants who were unable to digest 0.75 per cent. of calcium casein digested perfectly the 2 or 3 per cent. of casein lactate in the buttermilk. —The Monthly Cyclopædia of Practical Medicine, July, 1907.

Pseudomasturbation in Infants.—B. K. Rachford (Arch. of Ped., Aug., 1907). The author states that this is usually accomplished with the child "lying on its back, the thighs are flexed, crossed and pressed tightly together, closely embracing the external genitalia; in this position the infant makes a wriggling or up and down body movement and rubs its thighs together. In other instances the genitalia are rubbed with the hands or feet or against some piece of furniture or other foreign object." This gives a pleasurable excitement, the face becomes flushed, the nervous tension is increased and then follow relaxation, perspiration, quietness and sometimes sleep. Age is the most important etiological factor. One must remember that the bladder, rectum and external genitalia are rapidly developed and so after the first few months of life are capable of responding to reflex excitation. The internal sexual organs do not begin to respond to reflex excitation until near the tenth year, and so true masturbation, with but few exceptions does not begin until then. Pseudomasturbation may begin as early as the fourth month. More females develop this condition than males, perhaps due to the fact that the genitalia in the former are not as carefully looked after as in the male. Other etiological factors are, imitation of other children, heredity, illness, malnutrition, social condition and irritation of the nervous mechanism controlling the sexual organs. The prognosis is very good, of the 52 cases presented in the author's table 25 were cured, 7 were improving under treatment, and only 2 cases were unimproved. 17 cases received no treatment. The tendency, under two years, is to spontaneous recovery.

The treatment consists of breaking up the habit as soon as possible, removing all irritations at once, forcible restraint, and in older children punishment, is sometimes necessary. The daily cold bath, followed by cold douche, and sometimes the exhibition of bromid of potash and belladonna at bedtime.

The Frequency of Glycosuria in the Children of Diabetic Persons.—Arnold Lorand (The Monthly Cyclopædia of Practical Medicine, July, 1907). In order to ascertain this the author gave to ten such children a test dinner consisting of a large quantity of amylaceous food with beef and pork. The urine that was passed within two to four hours was examined by Trommer's and also by Nylander's test, and the doubtful cases with the more delicate methods. Out of the ten cases eight showed distinct traces of grape sugar in the urine. It seems to prove a certain weakness in such offspring for the elaboration of carbohydrates. They also show other peculiarities, entering early into the stage of puberty and also get gray at an early period, and are as a rule, of a nervous disposition. These children may perhaps be saved from diabetes if they are warned in time against leading a luxurious life, with nourishment rich in sweets and amylaceous foods.

The Opsonic Index in Cerebrospinal Meningitis.—Taylor (Lancet, July 6, '07) has studied the opsonic index and the agglutinative powers of the blood in eight cases of cerebrospinal meningitis. She states her conclusions as answers to certain questions, as follows: 1. Is a high opsonic index pathognomonic of the disease? It appears possible from these eight cases to obtain a definite opsonic index in cerebrospinal meningitis, either working with an old or young culture. A high index was present in all the cases; this appears to be due to the characteristic feature that normal serum has scarcely any opsonic power against a young culture of the meningococcus. It is therefore probable that a high opsonic index is pathognomonic of the disease. 2. Is a high opsonic index diagnostic in all forms of meningococcal meningitis? A high index is not always obtained if different strains of organisms be used. So that a normal index does not negative the presence of the disease. 3. Will it be possible by the difference in the opsonic index or agglutination associated with it to distinguish between the various forms of meningococci? The author was able thus to differentiate three strains. It seems probable that in order to obtain the fullest effects from a vaccine or serum treatment that the strain of organism employed in its preparation is of great importance.—N. Y. Med. Journ.

The Opsonic Index and the Tuberculin Test.—Thomas M. Rotch and Cleaveland Floyd (Journ. A. M. A., Aug. 24, 1907). The authors state that with the increasing interest and knowledge of the public in the question of tuberculosis much more will be demanded both from the pathologist and the general practitioner. It is now well understood that an early diagnosis means a cure; for the child whose vitality is relatively greater than the adult often is infected, but overcomes it and the pathologic process may become quiescent.

In 40 children living in families in which tuberculosis had occurred within the past eight years, 25 per cent. showed definite signs of consolidation at one apex, though all but one or two were free from any symptoms and were apparently well. If such cases can be recognized early enough much can be done towards a permanent cure, and the chances for dissemination avoided.

Tuberculin and the opsonic index are the two agents now claiming attention of the medical world in diagnosing tuberculosis. The former should only be used with the greatest care and by trained observers. The writers use the following method.

"The solution for using this test is prepared as follows: One cubic centimeter of Koch's old tuberculin is added to 999 c.c. of boiled distilled water—one c.c. of this solution equals one milligram. The dose of this solution for an infant or young child is from two to five milligrams, according to the age. In using this test a record of the child's temperature must first be kept every two hours for twenty-four hours. If it is then found that the temperature is irregular or high, the test is not of much value. If, however, the temperature is regular and not over 37.7 C. (100 F.), the test can be used, and has been found in our experience to be of considerable value. After the part of the skin to be injected has been thoroughly washed first with soap and water and then with alcohol, and the hands of the operator and the syringe disinfected, the injection is made. If the child is not tuberculous, no symptoms will be noticed, unless occasionally in certain cases of syphilis. If it is tuberculous, the temperature will rise in from eight to twenty-four hours after the injection and will fall again within about twenty-four hours. During the period of reaction there may be a certain amount of malaise, but in our experience there is little or no danger of serious results. A positive reaction will be obtained in about 95 per cent. of cases of tuberculosis. A negative reaction does not positively exclude tuberculosis, although it is very strong evidence against it.

"In giving tuberculin to children it is a question whether the best results can be obtained by beginning with a small dose and gradually leading up to the dose which will produce the reaction, or to give a reacting dose at once. It has been held by some observers that the small primary dose produces a certain amount of immunity which interferes with the desired final and marked reaction which proves that tuberculosis is present. On the other hand, it is now usually accepted that the small dose repeated with intervals of three days does not cause immunity and gives a less violent reaction. It is to be understood that too large a dose of tuberculin is as dangerous as too large a dose of any drug, notably opium, strychnin, or arsenic, which in proper doses are harmless, while in toxic doses they may be fatal."

"A positive reaction consists not only of a rise of one or more degrees of temperature above the previous level, but as much importance is to be placed on the constitutional symptoms and signs. When, following the injection of tuberculin, the patient complains in from 24 to 36 hours of headache, feverish sensations and nausea, and there are vomiting and diarrhea, with marked tenderness about the seat of the injection, and especially if there is an appearance of cogwheel or harsh breathing and râles over the suspected area, the result is positive, even without a decided rise of temperature. Some cases will give almost all these symptoms and others very few, but the examination of the chest immediately following a reaction is of great importance.

"The opsonic index may be a great aid in diagnosis when, on account of extreme prostration, or a high irregular temperature, tuberculin can not be given. If we follow the index in a case of pulmonary tuberculosis we find it runs in three different ways: low, high and fluctuating. They are important from a diagnostic point of view in the order given. Thus when we find a constant low index it may mean tuberculosis or only a lowered general resistance to the tubercle bacillus. When the index is constantly high we are generally justified in believing that the body is constantly taking up into itself small quantities of tubercular products, which from some focus stimulate it to increased resistance, and, therefore, keep the index high. Tuberculosis is practically always present when this occurs.

"The fluctuating index is of still greater value in that it indicates overdosage of the system with products from a tuberculous focus, and we, therefore, get a series of positive and negative phases. When the symptoms indicate tuberculosis and the physical signs correspond, we are generally safe in our diagnosis if the index is found to be a fluctuating one.

"Of still more importance is the treated serum reaction. This test is made in the same way as the ordinary opsonic index, except that both the normal and pathologic sera are treated for 10 minutes at 60 F. in water before using. If the opsonins in the pathologic serum are concentrated, they are not affected by heating, whereas those in the normal serum are destroyed. Comparison of these will then show practically no phagocytosis in the test with normal serum, as its opsonins have been destroyed, whereas the opsonins in concentrated form in the pathologic serum are unaffected and phagocytosis occurs."

The conclusions arrived at are: (1) The importance of early diagnosis which may mean cure and certainly preventing a spread of the disease. (2) Tuberculin is a valuable agent in early diagnosis when used with intelligence. (3) The opsonic index may be of great aid in the early diagnosis of tuberculosis when tuberculin cannot be used and may indicate the dose of tuberculin when used for diagnosis as well as for cure.

The Naso-Pharynx as Infection Carrier in Epidemic Cerebro-Spinal Meningitis.—FRASER and COMRIE (Scottish Med. and Surg. Journ., July, 1907) after bacteriological examination of the naso-pharynges of 69 fathers, the children of 15 of these having suffered from epidemic cerebro-spinal meningitis, during the recent epidemic in Leith, drew the following conclusions: (1) That hot, dusty, ill-ventilated atmospheres provide conditions favorable to the growth of the meningococcus and are often associated with the dissemination of epidemic cerebro-spinal menigitis. (2) That the high percentage of fathers whose naso-pharynx they found to contain the meningococcus, points to the fact that they are the carriers of the disease to their children. (3) That the chief incidence of the disease in the Leith epidemic was among children of the lower classes, and that this is in favor of a naso-pharyngeal infection. (4) That infection of the naso-pharynx is an important factor in spreading the disease. (5) That it is advisable to isolate all contacts and to carry out a bacteriological examination of the nose and naso-pharynx. If the meningococcus be present these centers should be disinfected and contacts should only be allowed to leave quarantine after the naso-pharynx has been reported free from the meningococcus on two consecutive occasions. E. F. CROFUTT.

Cultivation of the Meningococcus in the Present Epidemic of Cerebro-Spinal Meningitis in Belfast.—SYMMERS and WILSON (British Med. Journ., June 22, '07) give additional conclusive data concerning the specific relation of the diplococcus intracellularis meningitides of Werchselbaum to this disease. They have isolated the meningococcus from cerebro-spinal fluid in 52 cases out of 75 examined, and from the blood of living patients in 3 out of 15 cases. The organism is Gram negative, does not peptonize gelatine, produces indol, forms acid from glucose and maltose, but not from galactose. Gas is never produced, grows well in media containing raw acetic fluid, lives for at least a week on "chapasgar," lives from two weeks to a month on acetic bouillon, and from two weeks to two months in fluid sugar media. E. F. CROFUTT.

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ORIGINAL ARTICLES

SYPHILIS HEREDITARIA TARDA

By G. Frank Lydston, M.D., Chicago, Ill.,

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Fournier has directed attention to late hereditary syphilis in a series of lectures, and mentions some interesting cases in support of his view that the initial manifestations of hereditary syphilis may be after the period of infancy and even during the period of adolescence. I will quote briefly three of his cases. One was a case of interstitial keratitis and double sarcocele in a child, four years of age. Another was a child, aged seven years and six months, born of parents both of whom were syphilitic, who suffered from brain syphilis which yielded to the iodide of potassium. Still another case was that of a man, twenty-four years of age, who had mucous patches soon after birth, but no other symptoms until the age of sixteen, when he developed syphilitic gumma of the testis of a diffuse character. At the age of twenty-four extensive syphilomatous deposit occurred on this patient's tongue.

While the cases I have quoted are interesting, the classification and description of the various lesions seen late in life and attributed by this distinguished author to late hereditary syphilis are, in general, overdrawn. Were they true, there are very few persons with peculiarities of cranial or nasal structure who would be free from suspicion of hereditary taint. Many patients with precisely the same congenital characteristics described in some of Fournier's cases are met with who are suffering from severe acquired syphilis, which, while not impossible, would not be very likely to occur were the patients congenitally syphilitic.

In considering the question of late hereditary syphilis, it is very essential to inquire very minutely into the family history, so that not only the parents, but the brothers and sisters must be examined in order to arrive at a rational conclusion. The necessity for this careful inquiry has been shown quite plainly by the observations of Hulings Jackson, who has demonstrated conclusively that hereditary syphilis may be plainly marked in one member of a family, while the brothers and sisters show absolutely no traces of the disease. As has been already stated, many cases of disturbed nutrition termed struma or scrofulosis are probably syphilitic. Astley Cooper tacitly admitted this in his day. His favorite remedy for scrofula consisted of bichloride of mercury in Huxham's tincture of cinchona bark. Hutchinson apparently entertains a similar view. In the majority of instances the syphilitic child is indelibly stamped with the hereditary impress. As a rule, it is remarkable for its pinched, shriveled appearance, due probably to a lack of fatty tissue from malnutrition. The new-born baby has the look of an old man, and, if it lives long enough, has often the most supernatural look of intelligence that could be imagined. This wise little old man is as remorseless as fate in divulging the sins of his parents. He says little, but expresses much, and is a burden greater than the "Old Man of the Sea," so long as he lives. He is literally *persona non grata* to all concerned.

With regard to the lesions of congenital syphilis, if they are not present at birth, lesions of various kinds develop from time to time. The author has delivered children with a well-marked roseola. Chaps and excoriations of the quasi-mucous surfaces about the genitals, anus, and mouth are apt to develop, and may form true *plaques makueuses,* or even condylomata. A scalded appearance of the anus is quite characteristic. Snuffles develop after a time, and the nares become so clogged up that respiration and nursing are interfered with, and nutrition still further impaired. Ozena may develop and lead to necrosis of the nasal cartilages. There is no symptom of hereditary syphilis that is considered so characteristic in the minds of the mass of the profession as snuffles. Apropos of this I desire to warn the young physician that, if he begins diagnosing hereditary syphilis from this symptom alone there will be breakers ahead. A great number of young children, especially in such climates as that of our Lake region, are affected by catarrh or coryza that presents an excellent imitation of syphilitic snuffles. A diagnostic mistake in these cases will surely cause serious trouble, and it is safer for the physician to diagnose all cases as catarrh, meanwhile treating them as he sees fit, than to run any risk in diagnosis, especially where an accurate diagnosis might be unwelcome.

A livid macular eruption is sometimes seen, and ulcerations may form about the mucous orifices. Papular and postular lesions are not infrequent, and quite characteristically affect the palms and soles in certain instances. Subcutaneous tubercular lesions may be seen in some few cases. A very peculiar eruption occasionally occurs in syphilitic children that is quite identical in its physical characteristics with ordinary pemphigus in the adult. This "infantile pemphigus" is an unmistakable evidence of syphilis. It consists of an eruption of bullæ or blebs sparsely distributed over the skin. Sometimes but one or two bullæ are present. It is especialy apt to affect the palms of the hands and soles of the feet. The blebs are filled with fluid that varies in its physical characters from slightly turbid serum to pus, and is sometimes bloody. When the cuticle ruptures, the fluid dries into a greenish crust and ulceration occurs beneath, precisely as in syphilitic ecthyma or rupia.

It has been claimed that infantile pemphigus may result from simple cachexia, but the evidence of this is dubious, and it may be generally accepted as a positive evidence of syphilis. When a syphilitic child develops pemphigus, a severe type of disease is evidenced, and the case is usually hopeless. A severe case in a three-months' old infant recently seen by me made, however, a good recovery. The epithelial appendages of the body, such as the hair and nails, are not so likely to become affected in congenital syphilis as in the adult, but a brittle, lusterless condition of the nails is occasionally noted. As Hutchinson has shown, the nails may be repeatedly shed, or they may split and become ragged in appearance. They may even become affected by suppuration or onychia.[1]

It has been generally accepted that the osseous lesions of children are insignificant as compared with the same changes in the adult syphilitic. This, however, is a mistake. The author has been so fortunate as to observe a considerable number of bone lesions in children. One of the most frequent lesions observed in the cases of congenital syphilis at the New York Charity Hospital was syphilitic inflammation of the bones. It was the exception rather than the rule that serious visceral lesions were unaccompanied by osseous troubles. Taylor has called special attention to lesions of the bones in congenital syphilis.[2] He has shown that the most frequent seat of the osseous lesions is the diaphyso-epiphyseal junction of the long bones, certain bones, however, being affected with especial frequency. This is explained by the fact that the processes of growth and nutrition are most active at the junction of the diaphysis and epiphysis of all bones. The possible dependence of certain cases of rickets upon hereditary syphilis is a question which, although as yet *sub judice*, is of the greatest interest and importance. Parrot even goes so far as to claim a syphilitic origin for all cases of rickets. While this proposition is untenable, the author is inclined to believe that syphilis is responsible for quite a proportion of cases. It is certainly not fair to ignore Parrot's series of one hundred cases of rickets, of which 91 were unequivocally syphilitic. Kassowitz and several other German authorities claim that nearly all syphilitic children become rachitic, and Fournier, of the French school, believes that syphilis has much to do with the etiology of rickets. If this theory be well grounded, and it must be admitted that syphilis and its derivatives produce profound nutritive perversions, congenital syphilis and the inherited syphilitic diathesis are necessarily responsible for many deformities.

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[1] Hutchinson. Pathological Transactions, Vol. 12, p. 259.
[2] Taylor, R. W. Bone Syphilis in Children.

In syphilitic osteitis in infants the bones are usually more or less uniformly enlarged, although in certain instances the periosteum seems chiefly affected. Suppuration is infrequent, but is described by Bouchut as a result of softening of the cartilages of the epiphysis.[8] Necrosis is not very infrequent.

The most important of all the manifestations of hereditary syphilis are the lesions of the viscera. The processes of growth and nutrition in the infant are very active, and constructive changes are especially favored. These circumstances are particularly conducive to the proliferation of young connective tissue about the parenchyma of the viscera. These interstitial proliferations are usually diffuse, circumscribed cell deposits being exceptional. Such cases, however, have been observed. Any or all of the viscera may be involved, the connective tissue changes being especially apt to affect the liver, spleen, and kidneys.

There is in syphilitic new-born children a marked tendency to apoplectic effusions in various situations, particularly in the meninges of the brain and probably also the cord. The condition known as cephal-hematoma is especially apt to occur in syphilitic children, in whom the vessels seem to be characterized by great tenuity. If labor be at all diffiuclt, or if forceps be used, there is great danger of intracranial or subpericranial effusions. The author has noted five cases of meningeal hemorrhage in new-born syphilitic children, verified by autopsy, and by six cases of cephal-hematoma, four of which were undoubtedly syphilitic. In one case the child developed a cephal-hematoma soon after birth that absorbed in a few weeks. During the fourth week the child developed convulsions and died. On autopsy extensive changes in all the viscera were noted, and upon the surface of the brain a large clot from a ruptured meningeal vessel was found. In one of the author's cases of meningeal hemorrhage, the child was found dead by its mother's side, and a suspicion of foul play was entertained. The autopsy, however, showed an extensive meningeal hemorrhage.

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[8] Bouchut. Maladies des Enfants Nouveaux-Nes.

Causes of sudden death in syphilitic children have been occasionally noted by other observers, but there seems to have been no autopsy in the majority of instances, at least no explanation for these cases has been given, so far as the author is aware. It is probable that some of them have been due to meningeal hemorrhage. This is of medico-legal importance, and should be remembered.

A hemorrhagic tendency has been noticed in another form in syphilitic children.

Andronico reports the case of an infant born of a woman who, in the second month of pregnancy, had a chancre on the vulva. From the first days of life the child had coryza and marked icterus; soon afterward numerous points of a copper-red color appeared on the skin, and obstinate hemorrhage took place from the umbilical cord. The child died on the ninth day. Another case is reported by de Luca. A woman acquired syphilis from her husband, and some years later gave birth to a child; the infant suffered from pemphigus, and soon after the bullæ became filled with blood, and petechiæ appeared on the legs. Finally, uncontrollable hemorrhage took place from the gums of the lower jaw, the umbilical cicatrix, and the intestines, and the child soon died.

Children are apt to develop hydrocephalus as a result of syphilitic inheritance. The author recalls to mind a family in which two successive children died of this disease as a result of congenital syphilis. The so-called rachitic appearance of the skull is often a manifestation of syphilis. The extreme pathological conditions of the brain in congenital cerebral syphilis are well shown by the following case, reported by Dr. Angel Money:

Case. Chronic syphilitic meningitis, arteritis, cerebral atrophy, and sclerosis in a boy aged 4. He was first seen at the age of eleven months, suffering from hydrocephalus. The skull was natiform, the root of the nose depressed, the spleen enlarged, and there were signs of disseminated choroiditis. Syphilitic taint was discovered in every member of the family. The boy improved and seemed to be almost well until August 18, 1888, when left spastic hemiplegia developed. On October 11 he lost his speech and developed right spastic hemiplegia, and on the 19th he died. At the necropsy the brain and dura mater were found to be adherent everywhere, but the adhesions could be separated. The arteries were much diseased; so was also the brain substance. The atrophy and sclerosis were most marked in regions supplied by the diseased arteries. The dura mater was four lines thick in the temporal regions, and resembled a fibroma in structure. The ependyma was granular in appearance, due to the formations of granulations composed of small, round nuclei; and the structure was of considerable density. Dr. Money also exhibited the brain of a microcephalic child, showing atrophy and sclerosis of the left hemisphere without disease of the arteries or membranes, but yet of syphilitic origin. The child could not stand, sit, or talk, and all the limbs were weak and spastic, but the left arm least so. Death occurred at the age of sixteen months, and the brain weighed fourteen ounces.

It is probable that congenital syphilis has a more or less marked influence in the causation of tubercular meningitis. The congenital taint may not give positive evidence of its presence by a development of unequivocal syphilitic disease, and yet may so impair nutrition as to favor the development of tubercle, in case of exposure to infection. The syphilitic soil is one in which the tubercle bacillus will flourish, and the remote conditions of malnutrition inherited from syphilitic parents are therefore a constant invitation to tubercular infection.

General Characters. The most accurate description of the symptoms of congenital syphilis that has ever been given is that of Mr. Jonathan Hutchinson. The syphilitic countenance as described by him is quite characteristic, and his description of the teeth in congenital syphilis is classic. The evidences given by the teeth cited by him are not pathognomonic nor are they always present even when positive signs of syphilis exist, but in general they are very valuable.

The permanent teeth, instead of being regular and symmetrically developed, are irregular, notched and pegged in appearance, and the conformation of the alveolar arch is imperfect. The two upper central incisors are Hutchinson's "test teeth." They are short, vertically notched, narrow, and rounded at their corners.

Hutchinson further says:

"Next in value to the malformation of the teeth are the state of the patient's skin, the conformation of his nose, and the contour of his forehead. The skin is almost always thick, pasty, and opaque. It also shows pits and scars, the relics of former eruptions, and at the angles of the mouth are radiating linear scars, running out into the cheeks. The bridge of the nose is almost always low, and broader than usual; often it is remarkably sunken and expanded. The forehead is usually large and protuberant in the region of the frontal eminences; often there is a well-marked broad depression a little above the eyebrows. The hair is usually dry and thin, and now and then the nails are broken and splitting into layers."

Interstitial keratitis is pathognomonic of inherited taint, and when coincident with the syphilitic type of teeth, puts the diagnosis beyond doubt.

There is one peculiarity about badly nourished syphilitic children that has especially impressed the author, and that is the appearance of the hands and feet. These members are scrawny and wrinkled, and resemble in miniature those of an aged person. The skin has the appearance presented by the integument of a part that has been over-distended from edema, after the serous effusion has become absorbed. Should the syphilitic child live, it will be observed to have a marked tendency to splay-foot, talipes, and such deformities. The general dusky appearance of new-born syphilitic infants is also quite striking in most cases, and is due to a generally defective vascular tonus.

Prognosis. The prognosis of congenital syphilis is very unfavorable—fortunately so, in the author's opinion. The earlier the eruptions or other symptoms appear, the greater the danger. Marked eruptions occurring shortly after birth indicate a fatal prognosis. Severe and early ozena in badly nourished children is of like import. Marked visceral lesions and apoplectic effusions are always fatal. Lesions of the bones, if unaccompanied by marked visceral changes, are not so serious. In cases of *enteritus syphilitica*, a lesion first described by Lancereaux, there is no hope of saving the child.

In the face of the unfavorable prognosis of hereditary syphilis, it is some consolation to know that, as a rule, a syphilitic child is better dead, for it is a constant danger to its friends, and its life is, at best, but a miserable one. Sometimes, however, a syphilitic child becomes fat and healthy under proper treatment, and sometimes without it. This is borne out by the following case of the author's:

Case. The male child of parents who were both syphilitic presented the characteristic aged appearance of the syphilitic infant at birth. Double talipes was present, and altogether there seemed to be a most deplorable prospect for the child. An unfavorable prognosis was given, and as it seemed useless to prescribe for the infant—which was in nowise suffering—nothing was prescribed save inunctions of cod liver oil. The child is now six months old, and the author was greatly surprised when, a day or two since, the little patient was brought in by its mother. The infant was not only apparently healthy, and well nourished, but its feet were very nearly normal in appearance, as a result of persistent manipulation by the mother.

Treatment. The treatment of congenital syphilis is to be carried out in two ways, according to the age of the child, namely: (1) By direct medication of the child. (2) Indirect medication through the system of the mother.

The best internal remedy for the child is the hydrargyrum cum creta in doses from 1 to 3 or 4 grains, three times daily. In very young children inunctions of mercurial ointment or the oleate of mercury in very mild strength must be depended upon. A good plan is to spread a piece of blue ointment, the size of a large filbert, upon the flannel binder once daily. The delicate skin of the child absorbs this quite readily. Daily cleansing with soap and water, and frequent shifting of the position of the band, are necessary to avoid irritation. The soles of the feet, axillæ, and flexures of the joints are also eligible situations for inunctions.

In older children the bichloride of mercury may be given in small doses, in combination with some vegetable bitter, like

Huxham's tincture. Tablet triturates—mercury with chalk, protoiodide, mild chloride, or, best of all, the tannate—are also useful.

The general condition is always to be borne in mind in treating congenital syphilis; anemia especially must be guarded against. Cod liver oil and iron will always be of benefit. The syrup of iodide of iron is the best preparation. Young children absorb cod liver oil readily when given by inunction. The oleate of mercury may be combined with the oil. Good and sufficient nourishment is always required, but the child should not nurse from its mother, unless it is positive that she not only has or has had syphilis, but is in fair general health. While the author does not believe the fetus can be infected with syphilis save through the medium of the mother, such infection has been asserted by good authorities; hence it is not conservative to allow a syphilitic child to be nursed by an apparently healthy mother. A syphilitic child should never be reared by a nurse who has not had syphilis. In general, pure cow's milk is best for the child. When the child is nursed by its mother or by a wet nurse it may be treated through the medium of the breast milk by the administration of potassic iodide. This drug is eliminated in great part by the mammary glands, which physiological fact is of great therapeutic service in hereditary syphilis. From five to ten grains may be given four or five times daily, care being exercised in regard to the production of gastro-enteric irritation in both mother and child.

The local management of congenital syphilis is often of importance. Perfect cleanliness is a paramount indication. Ulcers and excoriations should be kept clean and dry, and dusted with calomel, oxide or stearate of zinc. Condylomata are to be treated as in the adult, but with milder applications. Ozena requires local treatment, and a nasal douche of some antiseptic solution is useful. Seiler's tablets and the preparation known as listerine are useful for this purpose. The listerine should be diluted with about three or four parts of water, and used three times daily. Harsh applications should be avoided in syphilitic lesions of children, as their delicate skins are very intolerant of irritants of all kinds. In all cases of congenital syphilis the physician should warn the relatives and friends of the danger of contagion. Failure to do this may result seriously, as is illustrated by the following case of the author's:

Case. A young man contracted syphilis during the sixth month of his wife's first pregnancy. At about the seventh month a chancre appeared upon her right labium minus, and shortly after the child was born characteristic secondary syphilis developed. This first child was born healthy, a fact that is important as bearing upon the theory that the child escapes infection when the mother is not syphilized prior to the seventh month of utero-gestation. The child died of bronchitis at about the age of two years, having meanwhile presented no evidences of syphilis. Fifteen months later a second child was born that presented positive evidences of syphilis. This child died in about three weeks, during which time it was under the care of its grandmother and aunt. These benighted females caressed and fondled the infant incessantly, the family physician having failed to apprise them of the danger of infection. Within about two weeks after the death of the infant both ladies developed labial chancre, which was in due time followed by secondary syphilis. As a final complication of the infection of this family, the grandmother subsequently infected her husband. Thus the infection of one individual was responsible for the syphilization of five persons. Had proper caution been observed, the disease might at least have been confined to the syphilized infant and its parents.

*THE TREATMENT OF TUBERCULOSIS OF THE BONES.

By Wisner R. Townsend, A.M., M.D.

The treatment of tuberculosis of the bones is a subject of interest, not only to the surgeon, but to the general practitioner. Early diagnosis, which is so essential to successful treatment, must be made in nearly every instance by the latter, and although tuberculous foci in bone are rarely, if ever, primary, yet the bone symptoms are often the first to attract the attention and in the early stages many erroneous diagnoses are made and much valuable time lost before proper treatment is instituted. The most frequent error is to overlook the condition entirely and to treat beginning bone disease for rheumatism, sprains or other conditions. The increased attention given to tuberculosis, not only by the profession, but by the laity, has greatly increased the knowledge of symptoms of the disease and early diagnoses will, therefore, more frequently be made in the future than formerly was the case.

In considering the treatment of bone tuberculosis, one must consider the subject from the standpoint of the general treatment of the patient for tuberculosis, and the local treatment of the affected bone. Before this audience, and especially after hearing the valuable papers that have been presented relating to treatment this portion of the subject may be dismissed with a very few words.

That those suffering from a tuberculous focus of any portion

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*Read at meeting of Fourth District Branch, Medical Society of the State of New York, Saranac Lake, Sept. 18, 1907.

of the body need fresh air, proper hygienic surroundings and nourishing food is not to be denied; but that the amount of attention given to these points has been but slight in patients suffering with tuberculosis of the bones is unfortunately but too true. That bone tuberculosis was curable and needed special treatment has been admitted for years, but it must be confessed that many of those who have been considered most competent to treat such conditions, until lately have not paid sufficient attention to the out-door life, to the benefits of fresh air, to life in the country and to a proper diet. It may, therefore, be stated that it is fully as important in bone as in pulmonary tuberculosis, to in every way possible improve the general health and the powers of resistance to disease.

The local treatment should be considered from the standpoint of the effect of the disease upon the part affected, from the danger of complications and from the question of the final or end result after treatment in the majority of cases.

The effect of tuberculosis in bone varies according to the bone affected, but as a rule its tendency is to produce a more or less complete disability of the bone itself and of the neighboring articulation or, if the disease affects a spinal vertebra, not only will the motion of the adjacent articulations be interfered with, but the entire spine may be held stiffly and all its motions be limited. Proper treatment, therefore, must take these facts into consideration and for each bone affected supply a line of treatment that will amply protect the affected portion and its adjoining or remote articulations. It may also take into consideration the function or particular use of the diseased bone. Rest or a dimunition of motion may prevent, and certainly will limit the inflammatory process and promote healing. Therefore, the best method of securing rest without too great interference with function, should be carefully considered in every instance. To go into details for every bone of the body would require too much time and involve needless repetition. A few simple rules or principles of treatment, however, are essential. Where complete rest is possible, it should be given, and this can be done with most of the bones, the only notable exceptions being the ribs. As these move with the respiratory act, to limit the latter is all that is possible or desirable.

As the focus is usually at or near the epiphysis, the adjoining articulation must also be kept at rest and where there are a number of articulations closely connected, as in the carpus, tarsus and spine, many joints must be immobilized. In the upper extremity a simple retentive apparatus may suffice, but in the lower extremity, weight bearing is a factor not to be overlooked and perfect rest cannot be secured unless crutches or some form of apparatus is provided that will remove the weight of the body from the affected bone. In the spinal vertebrae, if the diseased focus is above the sixth Dorsal, the weight of the vertebrae above and of the head must be lifted from the diseased portion by suitable and properly applied apparatus, if the patient is to sit up or go about.

Recumbency in the treatment of spinal tuberculosis is of the greatest value and it is a very simple matter to keep the very young for long periods flat on the back or flat with a suitable pad to overcome the posterior displacement of the disease. The Bradford frame, the Sayre Cuirass, the plaster jacket, the Taylor and other spinal braces, with or without traction, can all be used to advantage. The recumbent plan is also of use in older children and adults provided it does not interfere with the general health and appetite. Some patients, despite the fact that the local disease is doing nicely, lose appetite and do not progress satisfactorily if confined to the bed for long periods of time,—of course, in most instances proper care is not taken to have the patient kept in the open air a part, at least, of each day, nor is the diet suitably regulated. Were proper attention given to these and other necessary details, recumbency could be more successfully practiced.

Another detail that requires careful regulation is the amount of exercise that may be permitted those suffering from bone tuberculosis. This varies, and as the local conditions improve, it is not uncommon for the patients to attempt too much, especially as they are usually handicapped by some form of apparatus and this cannot be removed until a cure has been established. The length of time that treatment must be continued is always a perplexing problem but it can be confidently stated that most patients have the apparatus removed or treatment discontinued too soon or before a thorough cure is effected. Most of the relapses seen are due to this fact. There is no difficulty in persuading a patient who is doing badly that further treatment is necessary, but such is not the case when the symptoms are slight and they consider they are doing nicely.

In all instances treatment should be continued as long as any symptoms exist, and apparatus should be removed tentatively and for short periods of time at the beginning.

Since the advent of the X-ray the radical treatment of bone tuberculosis has been advocated by many. The argument is used that the focus can and should be removed as soon as made out, the same as we would remove a malignant tumor. Many successful results have been reported by this method of treatment and where a focus can be clearly made out, which does not involve an articulation, and where strict asepsis can be carried out, the method is worthy of further trial. It is also to be recommended more freely for adults than for children, because the element of time is of far more importance. This is especially true of wage-earners. If by a complete excision of a diseased focus, a patient can return to work in a few months, it is preferable to a form of treatment lasting years. It is also impossible to carry out some forms of treatment as well in the adult as in the child, because those of maturer years worry more; think more, and become sooner discouraged and their increased weight is a severe handicap in the application of apparatus.

It is claimed for this method also that deformity can be prevented and the extension of the disease checked. These results will depend upon the location of the focus and the amount of bone removed.

If this plan is followed out, it is better to remove considerable healthy bone about the diseased focus and thus remove all diseased tissue, than to curette or scrape out only the focus. In young children the spongy tissue of bone may be very soft, and it is not always easy to determine where a focus begins or ends. There is one serious objection to the method in the young, especially to the removal of tissues about the epiphysis from the bones of the lower extremities, namely, that the growth of the part may be seriously interfered with. The writer has in mind a boy now eighteen years of age who at the age of two had an excision of the knee performed by one of the leading surgeons of that day in which the result was most satisfactory until the age of four when the shortening was less than one inch; after that time the retardation of growth in the excised leg was very marked, and to-day it is in excess of twelve inches. The local lesion was cured, but the shortened limb is a serious handicap. By proper local treatment by apparatus, such a patient might have recovered with good motion or with limited motion, or at the very worst with a stiff knee, but with two legs of practically equal length. It is for this reason that excision in early life in the lower extremity has been practically abandoned, except as a life-saving measure.

All other forms of local treatment, by injections of various materials, by caustics and external applications have not stood the test of time and to-day are but little used.

Bier's method of passive congestion or hyperaemia has not been fully tested in this country except by a few surgeons. In the wrist and elbow satisfactory results have been reported. In the larger joints it has not given as good results, but is worthy of further trial.

The complications of tuberculosis of bone are abscesses, sepsis and meningitis.

Abscesses may be sterile and be absorbed without becoming septic and produce but slight symptoms, and not materially affect the final result. Many such cases have been reported and if the abscess does not interfere with or connect with an articulation, or with the application of apparatus, it can safely be let alone. If it increases in size rapidly or threatens to break into a joint, it may be aspirated under aseptic precautions and thus made to disappear. In most instances, more than one aspiration is necessary. Abscesses containing over a quart of sterile fluid, giant cells, bone detritus, and broken down tissue have thus been frequently cured.

In aspirating an abscess there are certain details of treatment which must be carefully carried out, if we desire successful results.

In the first place, the asepsis must be perfect. The same care should be taken in preparing the wound, sterilizing the needle, and the hands, as if we were about to do a serious surgical operation. The needle should be sufficiently large to permit of the withdrawal of the fluid, which is frequently rather thick in consistency. If by any chance the needle becomes choked with the material, from the cavity, the opening should be cleared free by injecting into the cavity a small quantity of sterile water or weak bi-chloride or carbolic solution. This procedure will often enable one to easily empty an abscess which could not otherwise be evacuated. If the abscess cavity is very large, firm compression must be made after the fluid is withdrawn from it, in order to prevent damage, and in all instances, it is desirable after emptying the abscess cavity, to make firm compression, preferably by strips of adhesive plaster, securely bandaged across, a bandage of sterile gauze and a light dressing can then be applied. The needle should be inserted so that it can pass through different tissues at a different point or obliquely and not go directly into the cavity, thus insuring complete closure of the opening when it is withdrawn.

When the abscess refills, it should be evacuated again, but not from the same point, as it sometimes occurs that the abscess breaks down and a sinus forms connecting with the outside skin. It is desirable to always make the needle puncture in such a direction that if it should break down, it will afford good free drainage. Undue rubbing around of the needle within the abscess cavity, or undue squeezing or pressure to thoroughly evacuate the last drop, are not desirable procedures, and should not be adopted.

It is preferable if all the material cannot be withdrawn through one puncture, as is the case in many instances, to make another one at a different side, as there are frequently conditions of adhesion which exist around a portion of the abscess, or in other words, there may be one or more abscesses connected by a very small opening. Cocaine anesthesia can be used to prevent pain, but if the needle is sharp and one is not afraid to puncture sufficiently deep, it is generally done as well without the use of any anesthetic.

Before aspiration the needle should be thoroughly tested, because the writer has seen abscess cavities where no fluid could be withdrawn, and when the needle was withdrawn, it was found to be clogged.

This simple direction and advice would seem unnecessary were it not for the facts above stated. The evacuation of the abscess by a knife under sterile conditions, and complete closure at once without the use of carbolic acid, iodoform and other drugs, is a method that has a certain number of adherents, and some cases undoubtedly do well when so treated, but there is considerable risk, even when all precautions are taken, of infection occurring, and much greater risk in the writer's opinion than when aspiration is practiced. The injection of fluids of various compensation into the aspirated cavity has been adopted by many, but the success attained does not seem to indicate that it is of any great value. Simple aspiration gives as good results.

It is needless to add that in all cases where aspiration is practiced, every effort must be made to prevent the fluid entering any of the cavities of the body, and care should be exercised to prevent the needle entering either veins or arteries.

If sepsis occurs, the proper surgical procedure of prompt and free evacuation is indicated. At the same time that this is done, the diseased bone may be removed and in extreme cases arthrotomy, excision or even amputation will be necessary. For tubercular meningitis no specific form of treatment has so far been advocated, and this complication is almost invariably a fatal one.

The end results of bone tuberculosis, if general or pulmonary tuberculosis does not occur, are good. About 25 per cent. make good recoveries as far as function is concerned, and a large percentage with limited function, but no subsequent symptoms referable to the bone disease.

An Unrecognized Etiological Factor in the Summer Diarrheas of Infants.—James Lawson Walsh (Medical Record) calls attention to the cathartic property in the grasses which form the food of so many cows from May up to the autumn. This property disappears when the grass is dried in the form of hay. The mortality curve follows the life of this type of vegetation, reaching its maximum in July, then gradually declining. Infants get the full physiological effects and often the tonxic effects of the aperient properties in the milk from the grass-fed cows. From October to May there is almost none of this diarrheal tendency apparent. Sterilization does not destroy this poison, which is a chemical one. The cow whose milk is used for infants should be kept off of pasture, and should be stall-fed, as in the winter. The chemistry of the grasses offers a comparatively new field for study.—New England Medical Monthly.

THE THYROID GLAND IN RELATION TO MARASMUS.[1]

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As very little has been written on the condition of the thyroid gland in children, I began some time ago to make some investigations in that subject at the Sick Children's Hospital.

During the last two or three years, I have examined the thyroid gland in a large number of cases on which a post-mortem examination had been held, in order to ascertain what changes, if any, are to be found in this gland amongst children dying from various diseases.

Normal Thyroid of a Child.—The normal thyroid of a child differs very slightly from the normal thyroid of the adult. In both we find the gland invested by a firm fibrous capsule, which sends in septa partially dividing it into lobules of various sizes, while still finer divisions of this connective tissue framework surround the individual follicles, and give support to the minute ramifications of blood-vessels, lymphatics, and nerves. In the child, however, the connective tissue of the gland is found to be somewhat more strongly developed, whilst the follicles, lined by cubical epithelium and filled with colloid, are more irregular in size and shape than are those of the adult.

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[1] Scottish Medical and Surgical Journal.

A few words must here suffice to describe the development and chemistry of the thyroid so far as they are known to us.

The gland is developed primarily as an outgrowth of the pharyngeal hypoblast, and in some lower animals this connection with the pharynx is still maintained. In amphioxus, for example, the thyroid is represented by a hypobronchial organ, which pours the secretion directly into the pharynx; whilst in some higher forms of life, such as in fishes, the gland is embedded in the surrounding tissues, but the duct which communicates with the pharynx still remains. The developmental history therefore clearly shows that the thyroid as we now find it in man has been evolved from a secretory gland, which originally was provided with a duct, through which its secretion passed into the pharynx. We naturally infer, therefore, that, originally at least, the thyroid secretion played some part in the digestion of food. This would also help us to understand the fact that the activity of the thyroid secretion is not destroyed by passage through the stomach, but can still produce all its usual physiological effects when swallowed and absorbed from the alimentary canal, so that, as experience now proves, feeding by the gland itself acts as efficiently as injecting its extract.

Something must now be said in regard to the colloid substance.

This colloid substance is the secretion of the epithelial cells which line the alveoli, and, as the thyroid is a ductless gland, the secretion can only escape by the lymphatics or veins. The evidence which we possess indicates the lymphatics as the usual path.

As to its composition, much careful research work has been done by physiological chemists, but so far our knowledge of this secretion is by no means complete, though several important constituents have now been separated out from it. It was early proved that the gland contained considerable quantities of extractives, viz. Xanthin, Hypoxanthin, Kreatin, etc., indicating high metabolic activity, but none of those could be looked on as the active principle. In 1896, Baumann of Freiburg isolated from the thyroid gland of man, and of many animals, a body containing Iodine in organic combination, and which possessed the physiological characteristics of the gland. He further showed that this body was as active as the thyroid extract itself, and from this he concluded that "Thyroidin," as he named this substance, was the active principle of the gland. Oswald, who substantiated these views, also says that the colloid material is a mixture of Thyro-globulin and Nucleo-proteid. The Thyro-globulin, which forms the greater part of the colloid, combines with the Iodine to form an Iodin-albuminous substance, and from this substance can be separated out the so-called active principle "Thyroidin." Baldoni found that in some goitrous glands there was a Thyro-globulin which did not contain Iodine, and this Thyro-globulin containing no Iodine was proved to be physiologically inert. This shows that the physiological activity of the Thyro-globulin depends on its containing Iodine in the molecule. I would specially draw your attention to this fact, as I shall point out afterwards, in discussing the gland in marasmic children, that this colloid material containing Iodine seems to be very important.

I have now collected and examined 80 different thyroid glands taken from children who have died of various diseases, and these I have classified under the following groups:—

Thyroids of children dying of: —

I. Acute Diseases (Broncho-Pneumonia, Endocarditis, etc.).
II. Tuberculous Diseases.
III. Marasmus.

Before, however, recording the results observed, let me very shortly point out the appearance of the thyroid as seen in premature children. In 4½ months old fœtuses, colloid material may be observed in the vesicles, whilst in premature children of 8 months, the gland may appear practically normal; nevertheless, in all premature, and indeed in all newly-born children, there seems to be to some extent a certain deficiency in the amount of the colloid substance. It may be mentioned, however, that the appearance of the gland will, as we shall afterwards notice, vary according to the cause of the prematurity. And now to return to the results obtained under the above mentioned classification.

Group I. *Acute Diseases.*—There were in a large number of cases well-marked changes to be seen, ranging from a condition in which little departure could be observed from the normal, down to an almost total destruction of the follicle, which left the gland scarcely recognisable. Moreover, most of those sections which showed a marked departure from the normal showed also a great similarity in their changes, the most noticeable features being:

(*a*) Marked diminution of the colloid.

(*b*) Vesicles without colloid frequently filled with infiltrating cells.

(*c*) Increase in fibrous tissue.

GROUP II. *Tuberculous Diseases.*—The changes seen in the thyroid were much the same as those already observed under the group "Acute Diseases," though, in passing, I may mention that in this group departure from the normal took the form of "increase in fibrous tissue" more frequently than those other forms of changes specified under (*a*) and (*b*).

GROUP III. *Marasmus.*—On examining sections, however, of the thyroids classed under the third group, viz. *Marasmus*, the marked, and almost constant changes seen in the gland of children dying in this condition were most striking. I have examined them in ten cases of pure marasmus and they all showed:—

1. A large proportion of the vesicles patent but devoid of colloid.
2. Marked increase of fibrous tissue, frequently intra-vesicular.
3. Marked cell proliferation in a number of the vesicles.

The very marked, constant, and more or less similar changes which the thyroids classified under the group "Marasmus" always presented, led me to wonder if the changes observed were the result of a marasmic condition, or if, on the contrary, an abnormal and diseased state of the gland might not be the chief or *one* of the chief factors in the causation of that disease. Further observation and investigation have in my opinion confirmed this latter view, and led me to believe that the thyroid plays an extremely important part in the nutrition of the infant.

MARASMUS.

Having glanced at the structure and development of the thyroid, its chemistry (especially as regards the colloid secretion), etc., let us now see if changes in this gland could in any way account for the atrophic condition found in marasmus. In other words, has this "internal secretion" of the thyroid anything to do with the condition of atrophy so frequently seen amongst the children especially of the poorer sections of the community?

Marasmus is the name applied to a condition of extreme wasting seen in infancy. It may be associated with some gastro-intestinal disturbance, but very frequently no symptoms, beyond the wasting of the muscles and of the body fat, are noticed; while a post-mortem examination reveals nothing beyond an atrophic condition of the alimentary tract, though Ruhrah has recently pointed out that the thymus gland is in all such cases also affected.

Many theories have been propounded as to the cause of the condition. Babinsky thought that the disease was due to an atrophy of the mucous membrane of the intestine which interfered with absorption—and hence the general atrophy. Since that time, however, many investigators have disproved this statement. In the majority of cases the changes observed were due to the stretching of the intestinal wall by distension with intestinal gases, and also partly in many cases to post-mortem changes.

Heubner and Rubner, as the result of experiments, formulated the theory that sufficient food was both taken and absorbed, but that the trouble was due to auto-intoxication, from the decomposition of food in the intestinal tract. Other writers have for the most part adopted this view, and Ruhrah remarks, "We may safely assert that the trouble is not due to the amount of food ingested, nor to the amount absorbed, but is due to mal-assimilation of the food material of the body."

This theory seems to me to be to a large extent a correct one, as no one can have failed to notice that, though marasmic children continue to lose weight, they still seem to take a sufficiency of food, and an examination of the fœces shows these very frequently to be in a normal state. The course of the disease is usually chronic, and in the majority of cases fatal.

The causes which predispose to marasmus in infancy are frequently very obscure, but in the opinion of those best qualified to judge, they may be broadly stated under the following heads:—

I. Constitutional causes.
II. Improper feeding.
III. Bad hygienic surroundings.
IV. Acute disease.

I. *Constitutional Causes.*

These may occur either as the result of prematurity of birth, or of disease on the part of the parent, and consequent inherited weakness of the infant.

As everyone knows, premature children are very difficult to rear. The *reason* for this, however, is not so easy of explanation. The question has recently suggested itself to my mind. Can the condition of the thyroid have any connection with this difficulty?

As noted in our previous description, the gland of a premature child may appear almost normal; very frequently, however, there is a scarcity in the amount of colloid present. As this substance contains the active principle of the gland, it follows that the child must materially suffer from this deficiency; and even in those cases in which the amount appears more or less normal, a defective composition of the colloid secretion has been found to exist. Various observers have shown that age has an important influence on the iodine contents of the gland, and that in infants it contains proportionately the least quantity of this substance. Richardson analysed the thyroids of several children who died immediately after birth, and also those of some prematurely-born infants, and he has never been able to find in them a trace of iodine or of blood-pressure reducing substance. We may therefore conclude that the thyroid of a newly-born child contains little or no iodine. I have already pointed out in treating of the chemistry of the gland that "the thyroglobulin containing no iodine is proved to be physiologically inert"; it follows, therefore, that new-born and young infants have little or no efficient thyroid secretion. The more premature the child, the greater is the likelihood that no active principle is present in the gland. Not only does prematurity affect the secretion, but even the causes of prematurity, such as disease of the parents (tuberculosis, syphilis, alcoholism) must be taken into account in considering the consequent inherited weakness on the part of the infant. It is a well-recognised fact that children of unhealthy parents are born with feeble resisting power, and with greater predisposition to various illnesses than are the offspring of healthy individuals. We are now in possession of certain facts regarding the thyroid which, I believe, may throw some light on the frequency with which the children of unhealthy parents fall into an atrophic state. It has been observed that during pregnancy there is a marked modification of the thyroid gland. Freund found an augmentation of volume in 45 out of 50 women. It has also frequently been noticed that a suppression of menstruation often produces a swelling of the gland, which disappears on the re-establishment of the menstrual flow.

Such observations are extremely interesting from the fact pointed out by Gautier that menstrual blood contains iodine and arsenic, both of which substances form part of the normal secretion of the thyroid.

It has been noticed also that adults who suffer from tuberculous disease, chronic alcoholism, or syphilis, have almost invariably sclerosis of the thyroid, and this condition has been found to exist also in the newly-born offspring of tuberculous mothers. I have also found well-marked sclerosis in the thyroid of an eight months fœtus whose mother was syphilitic. John Thomson, in an article on Cretinism, says: "In the few cases in which cretin women have become pregnant and delivery has taken place, the infant, although not myxœdematous, has been either atrophied or hydrocephalic at birth, and has died soon afterwards." It seems probable, therefore, that an unhealthy parentage may produce degenerate changes in the thyroid of the offspring, and if, as I think, this gland in infants plays a very important part in the assimilation of food, we can in such cases readily account for the marasmic condition of such children.

II. *Improper Feeding.*

It is a noteworthy fact that children fed at the breast of a healthy mother seldom, if ever, suffer from marasmus, if the surroundings be at all favorable; while often, even under unfavorable hygienic conditions, an entirely breast-fed child will thrive splendidly. In almost every case it is the artificially-fed infant that is prone to suffer from atrophy, and, the more unsuitable the feeding, the more apt is the child to become affected. Further, when once this condition of atrophy has set in, and digestion has consequently been seriously weakened, the infant continues to waste, even when supplied with more wholesome food. This is especially true of infants under 4 or 5 months of age.

It must be admitted that occasionally in Out-patient work at the Sick Children's Hospital one finds an atrophic baby who is being brought up on the breast; on going into the history of the case, however, one invariably finds either that the infant is also being supplied with other very unsuitable kinds of nourishment, or that the mother is in an unhealthy state.

Children brought up on the bottle are in many cases very difficult to rear. One of the chief reasons for this is no doubt found in the fact that cow's milk, on account of its large excess of casein, forms, during digestion, a much denser clot in the stomach than human milk. "The proteids of milk are of two kinds—casein and albumen—and a reliable estimate has given their proportion as six parts of casein to one of albumen in cow's milk, but as equal in human milk. When one remembers that albumen is a much more easily digested form of proteid than casein, it is evident that there is here an important practical difference between the two milks."

It will therefore be evident that in most cases, and certainly in that of all feeble children, pure cow's milk will be found to disagree, and to require some modification to render it more suitable for the digestive powers of the infant. Even after trying all the known methods of modification—dilution, peptonising, etc.—one still frequently finds that the child does not thrive, because, as Hutchison puts it, "a truly 'humanised' cow's milk is a chemical impossibility."

But apart from the foregoing considerations, which obviously indicate points of superiority possessed by human milk when contrasted with cow's milk for the feeding of infants, it has also been shown that *thyro-globulin* is excreted along with the milk of the human subject; the child receiving in this manner the amount of thyro-globulin necessary for its metabolism. This seems a very essential provision when we consider the nature of the thyroid secretion of a child at birth, and for some few months afterwards. There being little or no iodine, there is therefore little or no thyroidin in the gland.

In the case of a calf, however, the thyroid gland contains iodine even in utero, as well as the substance which increases the pulse-rate and reduces blood-pressure.

Such a comparison is extremely interesting, as it seems to point to the probability that, as the calf is already well supplied with thyroidin, cow's milk will not in all likelihood contain the same amount of that substance as human milk—a substance which in my opinion is necessary for the well-being of the infant, and for the assimilation of its food.

Before leaving this subject, I may mention still another fact which seems to me to point to the great influence exercised on the growth of the child by the thyroid secretion contained (even in small amount) in human milk. Why is it that ***mixed*** feeding (if the mother be healthy) is preferable to *complete artificial* feeding? If the mother be unable for any reason to do more than give the child the breast at night, while during the day it is artificially fed, the infant is nevertheless found to thrive very much better than when fed solely on the bottle. Of course the obtaining of two "natural feeds" in the twenty-four hours must in itself be beneficial; but the mere quantity taken does not seem to me proportionate to the great good received. May the benefit not be largely due to the child's obtaining from the mother's milk a certain amount of thyroid secretion which very materially assists the assimilation of the artificial foods?

III. *Unhealthy Surroundings.*

Infantile digestion is undoubtedly influenced by its surroundings. Infants born in poor circumstances breathe the foul air of crowded and badly ventilated dwellings; they are exposed to cold; they frequently lie night and day in contact with damp and filthy napkins; while at the same time they are strangers to fresh air and sunlight, and also often to all the care and numerous little attentions which are such important factors in the preservation of their health. Warmth, cleanliness, fresh air, and sunlight beyond doubt greatly influence the digestive processes. Why do we so seldom find marasmus in the children of well-to-do people who can afford all the necessary comforts for their infants? These children may not thrive well, they may even be exceedingly difficult to rear, but we very seldom see any well-marked cases of marasmus amongst them.

Considering marasmus, then, from the point of view of degenerative changes in the thyroid gland, let us try to find out more exactly what influence favorable or unfavorable surroundings might be likely to have on the progress of this disease.

This may perhaps be best brought out by observing the effect of good hygienic conditions on thyroidectomised animals.

Swale-Vincent and Jolly, in their paper on the "Thyroid and Parathyroid," say that they found it possible to keep thyroidectomised animals alive for a prolonged time by careful regulation of their surroundings—by warmth, cleanliness, and fresh air—while, on the other hand, if the animals were kept in badly-ventilated and cold cages, they very quickly developed unfavorable symptoms and died.

Observations made by physiologists on animals during a state of inanition are also interesting in this connection, as from all such experiments one main fact emerges. Schäfer states it thus: "For a considerable time, as a result of the oxidation of fat and body proteids, the temperature of a fasting animal is maintained at about its normal amount. Towards the end of starvation, however, the temperature begins to sink and finally rapidly falls, the meaning of this being that the animal has now practically exhausted all the nutriment which it can take from the tissues and that the amount of oxidation has become reduced, so that the temperature is no longer capable of being maintained at normal. The change is also in part due doubtless to the fact that the heat regulating functions of the nervous system are beginning to break down in consequence of the deficiency of nutriment. It has been suggested that an animal dying of starvation practically dies of cold; and it is undoubtedly true that the life of a starved animal can be prolonged considerably by the employment of artificial warmth, since this diminishes the amount of oxidation necessary for maintaining the animal heat and thus economises the energy-producing substances within the body; but it is of course not possible for the artificial warming of an animal to prolong life to any great extent under circumstances of complete deprivation of food." Now a marasmic child is in much the same condition as a starving animal; true, the child receives food, but as this food is not assimilated it is useless for purposes of nutrition. We are not surprised, therefore, to find the same symptoms and results in both cases; and that surroundings and conditions which tend to the prolongation of life in such animals are also of value in the case of the human subject.

IV. *After-effects of Illness, e.g. Pneumonia, etc.*

We have shown in our sections the results of the action of toxic agents on the thyroid gland. In going over the *"acute diseases"* and noticing the great changes which frequently take place in the thyroid as the result of such toxic action, one can quite understand that the gland may become so damaged as to be unable to properly fulfill its functions.

It has been pointed out by several observers that cretinism may supervene after some acute disease. This we can well understand, though deficiency in the thyroid secretion does not of course necessarily lead to cretinism. It is a recognised clinical fact that numbers of children, after an attack of, say, broncho-pneumonia or acute diarrhœa, suffer subsequently from an apparently disordered digestion and gradually become atrophic. I am inclined to think that this condition may in many of those cases be largely due to the degeneration of the thyroid, which, as a consequence, fails to produce a sufficiency of the necessary internal secretion. Such thyroids show under the microscope a great similarity to the thyroids of children dying from pure marasmus.

Such, then, are the reasons which lead me to believe that the thyroid secretion plays an important part in this condition of marasmus.

I shall now state what the results of my treatment based on this theory have been; for, after all, this is the essential test of the real value of these observations. The most experienced observers of such cases agree as to the almost total hopelessness of recovery when once a true state of atrophy has set in; and statistics amply bear this out, for they show an appalling infant mortality from this disease.

Treatment.

I have had the opportunity of treating a number of cases in the Out-patient Department, but I have also, throug the kindness of the physicians to the Hospital, been allowed to treat in the wards six well-marked cases of marasmus. These cases are of special interest and value for this reason, that they all had been under treatment in the wards for some time previously, and had all slowly but steadily lost weight. In order to make the test as complete as possible I also continued exactly the diet which had been given in the ward, and simply added one third to one half gr. of B. and W. Thyroid Tabloids.

CASE I. T. O., aged 3 months—an only child—was admitted to the Sick Children's Hospital on February 10th, 1906. The child appeared healthy at birth. For the first month he was on the breast, but was subsequently put on artificial diet as the mother had to go to work.

As the infant was not thriving and suffered from frequent vomiting he was brought, when 3 months old, to the Hospital. On account of the vomiting, and well marked gastric peristalsis, the case was considered to be one of pyloric stenosis. The child was carefully dieted and the stomach washed out frequently, and after admission he was sick only once; but although vomiting had ceased and food was well taken, the child did not thrive and steadily lost weight.

The weight on admission was 6 lb. 12 oz., and at the end of the fourth week the child had lost 12 oz., being then only 6 lb.

At this stage he appeared very low, drowsy, skin dry and wrinkled.

Thyroid was now administered (gr. one-third t. i. d.), the same diet as formerly being continued. The first change noticed was that the child became brighter and the temperature, which had previously been markedly subnormal, rose to 99 deg. Three days after thyroid treatment commenced he was weighed and was found to have gained 2 oz.; three days later a further gain of 6 oz. was registered, and at the end of two weeks the weight was 7 lb. 1 oz.—a gain of 17 oz. From this time onward the child slowly but steadily improved. Slight attacks of diarrhœa occasionally retarded progress, and on one occasion the thyroid had to be discontinued for two weeks owing to a more severe attack. Treatment ultimately ceased on June 29th, the weight then being 8 lb. 8 oz. Thus the child continued the thyroid treatment for nearly 3½ months, and in that time put on 2 lb. 8 oz. Since then he has improved steadily, and was sent out at the end of September weighing 11 lb.

Case II. C. B., aged 3 months, and weighing 7 lb. 2 oz., was admitted to the Hospital on December 27th, 1905. She had been brought up on cows' milk, but had not thriven, and although after admission she was carefully dieted, she was taken out of Hospital on January 16th unimproved, her weight having fallen to 6 lb. 12 oz.

On February 1st she was readmitted to Hospital with a bad prolapse of the bowel. Careful dieting was again carried out, but the child continued to lose weight. The prolapse improving, she was again sent out on February 13th, and came to me in the Out-patient Department. Her weight was then 6 lb. 8 oz. The same dieting which had been given in the ward was strictly enjoined: nevertheless, during the ensuing fortnight the loss in weight steadily continued till on March 7th she was reduced to 6 lb. 4 oz. Thyroid treatment was then begun (with the same diet), and at the end of two weeks she had gained 10 oz. Shortly afterwards she was readmitted to the ward, the same treatment as to thyroid and dietary being continued. The child steadily gained, and at the end of 10 days she was sent out, her weight standing at 7 lb. 9 oz. She has since then attended at Out-patients, her weight on May 5th being 8 lb. 14 oz. This child, on thyroid treatment, had thus put on 2 lb. 10 oz. in two months.

Case III. M. C., twin, aged 4 months, was admitted to ward on March 19th, weighing 5 lb. 12 oz.

For the previous fortnight she had been treated in the Out-patient Department and in that time she had lost 3 oz. On March 25th, 6 days after admission, she was put on thyroid, her weight then being 5 lb. 11 oz. One week afterwards she had gained 1 oz. The following week she gained 4 oz., being on April 7th, 6 lb. On April 8th the child became ill and vomited frequently. The temperature rose rapidly and the patient showed symptoms of commencing pneumonia. She became worse and died on April 10th. The post-mortem showed acute broncho-pneumonia.

Case IV. A. C., twin, aged 4 months, was admitted to ward on March 19th, weighing 6 lb. 12 oz.

She also had been treated in Out-patients for two weeks and had lost 2 oz.

Thyroid treatment was begun on March 25th, the child then weighing 6 lb. 9 oz.

The following week she gained 3 oz. and the week afterwards 4 oz., being, on April 7th, 7 lb. An attack of diarrhœa set in, which proved very troublesome and lasted till April 30th, when the child weighed 6 lb. 6 oz., having thus lost 10 oz. Thyroid was given all the time. The diarrhœa was then checked and the child began to pick up again, putting on in the next three weeks 12 oz.

On May 26th the temperature began to rise, and on the 28th the child was sent to the City Hospital suffering from measles. The weight on day of dismissal was 7 lb.

She was readmitted again on June 14th, having lost weight, and being now 6 lb. 6 oz. Thyroid treatment was again begun, and from that time she made slow but steady progress. She was dismissed on August 27th, weighing 9 lb. 2 oz., after having gained from time of readmittance 2 lb. 12 oz.

Case V. E. G., aged 5 months, admitted to ward, April 13th, weighing 5 lb. 14 oz. The child was put on a milk and cream mixture with Sod. Citrate but did not improve. She was then put on a milk whey and cream mixture, but, on May 2nd, two weeks after admission, she still remained 5 lb. 14 oz. Thyroid was then given and one week afterwards she had gained 4 oz. She gained nothing the next week, remaining at 6 lb. 2 oz. The following ten days she gained 4 oz., and in the next fortnight 9 oz., being on June 12th 6 lb. 15 oz. Her progress has been slow but steady, at the end of October she weighed 9 lb. 12 oz.

Case VI. T. H., 4 weeks, admitted to ward, April 15th, weighing 5 lb. 15 oz., and sent out on April 20th, weighing 6 lbs. He was readmitted to ward on May 1st, weighing 5 lb. 15 oz. Thyroid was begun, but slight diarrhœa supervened and the child lost 3 oz. in a fortnight. The diarrhœa was then stopped and the child began to put on weight slowly, being 6 lb. 4 oz. on June 1st when he was dismissed, as some severe cases of diarrhœa were in the ward. The child was brought to Out-patients, and the same dieting was continued along with the thyroid. The weight went up steadily, and on August 28th he weighed 8 lb. 9 oz. Before going away for holidays in September, I instructed the mother to bring the child up once a week to the ward to be weighed, and to get the weekly supply of thyroid. She came up on September 8th, when the child weighed 8 lb. 13 oz. She failed, however, to return till the 26th of September, and thus no thyroid was given for at least two weeks, during which the child was found to have lost 5 oz., being then 8 lb. 8 oz. He was again taken into the ward on September 27th, but no thyroid was given. The child gradually but steadily lost weight, and on October 18th weighed 6 lb. 15 oz. Thyroid was then begun, and from the first an improvement set in, the child putting on 4 oz. in the week. The next week he lost 3 oz., with slight diarrhœa, but in the succeeding 12 days he gained 8 oz., being on November 12th, 7 lb. 8 oz. Two days afterwards the child appeared unwell and an abscess in the neck developed. This has now been opened. On November 18th the child weighed 7 lb. 4 oz. and is at present still under treatment.

Besides those ward patients, I have notes of twelve cases of wasting children which were brought for treatment to the Out-patient Department. Three of the number have died and a fourth may be described as *in statu quo*—having only made a very slight gain in weight (5 oz. in one month) during treatment.

One of the three children who died came to the Out-patient Department in an exhausted condition, having suffered for three weeks previously from diarrhœa. This was checked, but the child succumbed to a second attack which came on two weeks after thyroid treatment had begun. The second child put on 5 oz. in 16 days, and was doing well; then a severe attack of diarrhœa with convulsions supervened, which terminated fatally.

The third death was that of a little child who attended the Out-patient Department for five weeks and was going on satisfactorily under treatment. She gained steadily and put on 15 oz. in five weeks; unfortunately, however, whooping-cough developed and ultimately broncho-pneumonia, to which she succumbed.

The remaining eight cases are doing well. Five of them may be considered as cured, and the three cases which are still under treatment are all showing satisfactory and steady improvement. Of these eight cases, six were put on thyroid treatment from the first, while the other two were simply dieted (without thyroid) during a period of three weeks. The two latter children continued to lose weight till thyroid was added, when an improvement became at once observable and has since been maintained. With regard to the six children who were put on thyroid from the first, one hesitates to claim for that treatment the absolute credit of their satisfactory progress, as strict injunctions were also laid down as to feeding, etc., which of course have a most important bearing on infantile health. This latter consideration, however, cannot in any way account for the ultimate good results seen in the children treated in the wards (already described) and the two in the Out-patient Department, as they had all been carefully dieted for some time, but continued to lose weight till thyroid was administered; a fact which seems to show very conclusively that the thyroid plays an extremely important part in the nutrition of the infant.

Now if such good results can be obtained in marasmic cases, the question naturally suggests itself: "Might not treatment by thyroid, if given at the beginning of the condition before much wasting has taken place, prevent to a large extent the further development of the disease?" I have had lately to treat six other cases outside Hospital, in which great difficulty was experienced with the feeding, the children not gaining in weight. Believing that "prevention is better than cure," I early treated those children with thyroid, and have in all of them obtained most satisfactory and beneficial results. Impressed as I am by these collective proofs of the advantages to be derived from treatment by thyroid, I am encouraged to hope that much may thus be done to diminish the great mortality from this condition.

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Clinical Pathology in Its Relation to Diagnosis and Treatment.—C. B. Lockwood (British Med. Journ., Aug. 31, 1907) relates several unusual cases, where clinical pathology had been of the greatest service. One hospital case was presented to him with the diagnosis of cellulitis of the scalp, a culture showed diphtheria and upon the exhibition of antitoxin the patient recovered after having had paralysis of various groups of muscles. Other cases showing the presence of the Klebs-Loeffler bacilli were "vulvitis"; an open sore of months' standing on a nurse; an empyema and an abscess of the breast.

All these cases were treated with the therapeutic serum and recovered with the exception of the empyema. The writer warns us against taking too much for granted, when we have at hand a positive means for diagnosis.

OBSERVATIONS ON THE SUPPURATING MIDDLE EAR DISEASES OF INFANCY AND CHILDHOOD

By S. J. Kopetzky, M.D.

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Instituting an examination of the records of our clinic at the Manhattan Eye, Ear and Throat Hospital, we find that during the last seven years there were 7,300 cases of ear disease examined. Of these 2,116 cases were children. That is, of all the cases treated 28 per cent. were children. Of the children applying for treatment, 69 per cent. suffered from middle ear suppuration.

During the first year of life, Barth (Otitis Media in Inancy: (Zeitschrift fuer Ohrenheilkunde, Vol. 32, 1898) places the percentage of all children having otitis media as high as 80%, basing his results on the observation of 600 cases.

Furthermore in material coming to autopsy from children whose death had been ascribed to various causes, the postmortem examinations demonstrated the ears diseased oftener than is suspected. Thus Ponfick (Berlin Klin. Woch., No. 38-41; 1897) finds in 100 autopsies where death had been ascribed to various causes, that only 9 cases evidenced normal ears. The cases in question were taken from the Breslau Klinik, and ranged in age from one day to 4 years. In detail, his results showed both ears involved 78 times and a unilateral involvement 13 times. He concludes that the autopsies demonstrated, aside from a moderate enlargement of the spleen, that the ear alone showed pathological changes, and therefore he believes that otitis media in infancy may occur as an independent infectious disease capable of causing death.

Furthermore, not only are many children affected, but many of the ear diseases of adult life date their origin to the early days of life. Of 100 cases of chronic middle ear suppuration among adults Barbarin (Thesé de Paris, 1902) found 42 traceable to the days of infancy and childhood. I find that about 27 per cent. of cases among adults give histories which lead me to uphold that the ear trouble among these patients is the sequelæ of an active process during the early formative period of the ear's development.

The gravity and importance of the disease of infancy and childhood is therefore apparent.

Looking into the causative factors tending toward their prevalency, we find that the frequency of middle ear suppuration in infancy and childhood is due to general constitutional disease, and the heredity influence of tuberculosis and syphilis; to the prevalence of exanthemata during childhood, and finally to the anatomical structures in the middle ear and its annexa, peculiar to the post partem development of the temporal bone. To go into the detailed discussion of these factors is without both the limits and the purposes of this paper; suffice it to say that many of the factors tending toward prevalency, are also pathologically remotely responsible for the production of middle ear suppurations in this class of patients. The immediate causes are found in the invading pathogenic organisms.

Many micro-organisms are to be found in causal relationship to the disease; the streptococcus pyogenus; the pneumococcus; the staphylococcus pyogenus; the pseudo influenza bacillus; Frankels' pneumo-bacillus; Friedlander's bacillus; the bacillus pyocyaneus, the tubercle bacillus; the gonococcus; Vincent's bacillus and spirillum, are among the more frequent.

The coincidence of otitis and pneumonia was commented on as early as 1864 by Streckeisen, and Wreden in 1868, and these comments read with findings of Scheniglidse (Inaugural Dissertation, St. Petersburg, 1900), who found pneumonia accompanied by otitis in 91.6 per cent. of 90 autopsies, point the lesson that the ears should be looked after in cases of pneumonia among infants and young children.

The route of invasion of the middle ear is usually through the Eustachian tube.

The clinical picture of the onset of a typical case of middle ear suppuration is usually sudden, with or without demonstrable cause, or coincidental with general systemic disturbances. There may be headache, languor or lassitude, and evidence of more or less pain on the affected side. Often both ears are simultaneously affected, although in varying degrees. Fever —and in children old enough to have it determined—an interference with hearing is evident proportionate to the degree of inflammation present. Rigidity of the neck is sometimes noted. This is the clinical picture in older children.

But in the young infant, and the child, where headache cannot be expressed, and where pain remains unlocalized, the question of the clinical picture becomes more difficult.

Generally, every child exhibiting uneasiness, fever, symptoms of cranial irritation should be examined as to its ears unless some distinct pathological condition is present to account for the symptoms. Even the early writers, Schwartze (1825), Meissner (1828), Helfft (1847), without the aid of otoscopic examinations, commented upon the ease with which children's ears were overlooked, and the frequency of their involvement.

Vomiting, somnolence, uneasiness, delirium and coma are the grave symptoms which ear disease brought in its train, these all subsiding with the advent of otorrhœa. V. Troltsch, who believed otoscopic examination almost impossible, made his diagnosis per exclusion. His construction of the clinical picture, as cited by Gomperz (Path. und Therapie der Mittelohrenzundungen in Sauglingsalter, Vienna, 1906), is worthy of repetition.

Uneasiness, restless sleep, interrupted at intervals by wakeful periods, the child rolling its head about on the pillow or boring into it, with an occasional characteristic cry of pain, repeated at the least jostling or shaking—these constitute a clinical picture whose recognition is easy to the present-day observer.

To touch the affected ear produces pain-cries. There are frequent remissions, the pauses lasting from hours to days. The loss of appetite is, however, constant. The act of swallowing may cause pain (Troltsch, Gomperz) and I have observed a nursing infant attempt to suck and after repeated trials let the nipple go, and start to cry. Feeding with the spoon was, however, successful.

In very young infants, gastro-intestinal disturbances manifest themselves, due to the absorption of toxins from the tympanic cavity, and the stools soon increase in frequency and become sour. This may or may not be accompanied by vomiting. Following the gastro-intestinal derangements, there is loss of weight.

Goppert (Yahrbuch f. Kinderheilkunde, 1897) holds the vomiting to be due to hyperemia of the dura, and partly due to irritation of the ear labyrinth, and Gomperz believes this symptom to be the first sign requiring an answer in the form of paracentesis.

The condition unrelieved, the fever continues high—in patients older than one month—and finally, after the development of mastoid antrum empyæmia, cerebral symptoms supervene, followed by coma and death.

We recently had under observation the case of a child, who, because of a diarrhea, and loss of weight accompanied by vomiting, was treated with various forms of milk modification for some time. The ears were not suspected until there suddenly developed facial paralysis followed closely by the advent of otorrhea. When finally the child reached our hands it was profoundly prostrated, emaciated, and the operative findings demonstrated a purulent involvement of the labyrinth, from which the child did not recover. (Case to be published shortly with others of a series.)

This case instances the importance of looking further than the bowels for the cause of the gastro-intestinal disturbances.

It must be borne in mind that bowels and lungs may be involved coincidentally, to the ear disease, or prior to it, or, as a result of the ear disease; and in any of such cases the difficulty is multiplied when attempting to analyze the clinical picture and differentiate the general from the local disease.

Regarding intestinal disturbances, it is a fact that these have been observed by many, coincidental to ear disease (also personal observation), but while some have held the bowel derangement and the vomiting as causative of the ear trouble (Goppert, Yahrbuch fuer Kinderheilkunde, Vol. 44-45, Heft 3), others hold the bowel derangement to be the result of the ear trouble (Preysing, Ponfik, Hartman), and Jacobi believes both contentions have foundation on fact.

Preysing's conclusions seem the most trustworthy (Otitis Media der Saugling, Weisbaden, 1905). He holds the diarrhea to be a kind of septic diarrhea, and recalls to our mind the fact that the pneumococcus—the most frequently offending micro-organism—belongs to that class of streptococci which are causal agents of sepsis; it having been demonstrated that streptococcus toxins cause diarrhea (Homer and Laetinen, Ziegler's Beitrag, Vol. 25; Heft 1).

Whatever may be the cause of the gastro-intestinal disturbances, it remains a fact that one often sees the onset and the termination of the disease in the ear, synchronous with the onset and termination of the bowel derangement, and I hold with Gomperz that any one who has observed this must be impressed with the direct effect produced upon the entire body by ear suppuration in infancy, the bowel derangement being a manifestation of this systemic effect.

I have observed cases where the nourishment of the child suffered, and where there seemed to be general malnutrition, anæmia, and generally a feeling of non-well being, in cases wherein the attending physician could not locate the disturbing factor, and the otoscopic examination demonstrated only a thickened drum. These cases remained obscure until an examination of the pharynx evidenced a purulent exudate coming away from the Eustachian tube (one case, girl, 3 years of age, and two male children aged 2 and 3 years respectively, in one of which—the younger—the purulent exudate also came from the nostril on the affected side).

Finally the advent of otorrhea. In younger children otorrhea does not present itself early. This has been held to be due to greater thickness of the child's drum (Jacobi and others). I do not believe that the thickness of the drum plays any rôle; but rather place the failure of the drum to perforate early, to the widely open Eustachian tube of the infant, affording partial drainage toward the pharynx. This saves the drum, and the disease may be present in the ear for some time, the deleterious products of suppuration absorbed and swallowed to the detriment of the child's health, long before the presence of otorrhea points the way to the diagnosis for the attending physician.

To summarize:

In view of the prevalency of middle ear suppuration in infancy and childhood, we hold that, when a child, without demonstrable cause and while under usual diet, begins to run fever, is restless, rolls its head and refuses to drink, meanwhile evidencing bowel derangement with consequent loss of weight, then, unless the clinical picture points to a definite pathological direction, the ears should be subjected to rigid examination to determine their condition.

Among older children, the localization of pain and the persistence of fever, with negative results from general examination points to ear involvement.

Finally, because a pathological process in the ears of young children may be present for a longer period than the obtainable history would suggest, it results, that many cases already have the elements of chronicity when the disease is discovered, bone necrosis having at this time already begun.

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CEREBRAL PNEUMONIA.*

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The cerebral complications in pneumonia often present a clinical picture which is very similar to that of true meningitis; in fact so much so, that the differential diagnosis is exceedingly difficult if not entirely impossible. It is to this phase of the subject that I especially desire to call attention in this paper. It would seem somewhat paradoxical to speak of "Cerebral Pneumonia" and I would have scarcely had the temerity to make use of the term, were it not that Fischer in his excellent work recently issued, has adopted it in his classification of the different forms of the disease.

During the season of last winter and spring we had more cerebral manifestations complicating our cases of pneumonia in children than I have witnessed for many years.

The following clinical sketch is fairly typical of our cerebral cases in the order in which the symptoms usually occurred. The disease was often ushered in with a chill or at least slight rigors, high temperature, 104 to 106 Fahr. from the beginning; vomiting which continued for several days; and sometimes convulsions marked the onset. Severe cephalalgia which continued as a rule until the patient lapsed into a state of sopor or semi-coma. In some cases there were unilateral spasms, followed by twitching of the shoulder and lower extremity. Patellar reflex absent on the affected side. Regional hyperesthesia; Tasche cerebral well marked in several cases. Rigidity of the muscles of the nuchia, but not to the degree of opisthotonos. Some retraction of abdomen. Twitching of the muscles of the eye and in some cases rolling of the eye-balls. Extreme contraction of the pupils with subsequent unilateral dilatation and sometimes dilatation of both pupils, but the latter ocular symptoms were only noticed in cases which terminated fatally.

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*Read before the Ohio State Pediatric Society at Cedar Point, O., Aug. 28, 1907.

When we are confronted with such a symptom-complex as above described we may well hedge in our diagnosis lest we may be obliged to acknowledge our mistake in a day or two. This is especially to be feared if the physical signs of pneumonia are obscure and ambiguous as they frequently are at the beginning of the disease. It is true that most all of these symptoms can be ascribed to the high temperature which usually prevails and especially to the sudden incursion of the high heat. Still some of the symptoms are so absolutely true to the meningitic syndrome that the most astute diagnostician may fail in differentiating between a serous meningitis and functional disorders of the brain.

A fresh accession of fever which is more intense than the original one must always arouse suspicion. So also a suddenly arising mild delirium, wandering and hallucination are important signs. The only characteristic feature of the delirium is that it is soon followed by stupor. Headache is persistent in all cases until sopor supervenes. Sopor and coma are very important if they appear a considerable time before the œdema of the lungs sets in; which ends the scene in the majority of fatal cases. A slight degree of rigidity and pain in the neck is always a valuable indication; but it cannot always be depended on, as it has been found present in cases in which the post-mortem revealed not a trace of meningitis. The pupils are generally contracted in the beginning and later on there may be unilateral dilatation, but these conditions are important only in so far as they accompany other significant symptoms. Spasmodic movements of the eye-balls are untrustworthy as they occur independently of meningitis. In fact the only ocular symptoms that are pathognomonic of basilar affections, are complete paralysis of the abducens or the motoroculi muscles. Even complete hemiplegia, occurring a short time before death, has been found to be due to œdema of some portion of the brain.

It is therefore evident that a diagnosis of meningitis during the course of pneumonia, should not be made from one or a few symptoms, but a conclusion must be based upon a preponderance of clinical evidence.

The older writers regarded the cerebral complications of pneumonia as a metastatic meningitis, and that the inflamation was confined to the convexity; the base and the upper part of the cord remaining intact, thus doing away with many of the most valuable diagnostic points. They also asserted that the high fever and the febrile processes generally, produced a diminished reaction and modified excitability, so as to obscure the symptoms of a meningitis which otherwise would have presented well marked and positive indications. The disease was supposed to be caused by the same poison or morbific influence as that which produced cerebro-spinal meningitis. In support of this conclusion we find the recorded statement that out of thirty autopsies, in cases of pneumonia, held by Immerman and Heller, of Germany, they found nine cases in which the pathological lesions of meningitis were present. They attributed this fact to an epidemic of cerebro-spinal meningitis which was prevailing at that time.

Since the Fraenkel diplococcus is recognized as the specific germ of pneumonia, and we know that this micro-organism is frequently found in the meninges as well as in the nasal and other secretions of the body; and that an inflammatory condition usually results from its presence, we are naturally led to the conclusion that whatever cerebral disturbances we find in pneumonia must be of an infectious character, essentially due to this specific organism or a toxine which it secretes. Granting this to be true the problem is easily solved. We simply conclude that whatever symptoms cannot be ascribed to hyperthermia must be due to toxemia and that in those cases in which the disease terminates in a crisis a rapid elimination of toxines takes place simultaneously with the subsidence of the fever; and the cerebral phenomena disappear at once. I have had experience though which does not conform to this idea. I have met with cases in children as well as adults, where the patient remained in a state of furious delirium after the fever had entirely subsided, and resolution of the pneumonia was progressing with remarkable rapidity. Now if the delirium had been due to cerebral toxemia why was it that the administration of a suitable hypnotic producing some hours of good sleep resulted in complete mental restoration as if by magic?

The sequel would prove that the delirium in those cases was perpetuated by hyperemia rather than by a toxemia.

I think the cerebral disturbance in some cases of pneumonia is aggravated by the senseless administration of large doses of strychnia, which is taught in modern text-books and is practiced especially by the younger members of the profession. In the effort to prevent the traditional heart failure, cerebral hyperemia is produced, which will surely result in exhaustion and death if such a course is persisted in. We all know that the nerve cell will respond to an irritant up to a certain point when paralysis ensues. So that the excessive doses of strychnia will produce precisely what they were intended to prevent. It seems to me that modern medicine has lost sight of the danger of exhaustion of the nerve centers in all forms of acute febrile diseases, and that the importance of rest and nutrition is badly underestimated.

A valuable lesson can be learned by observing nature's restorative efforts, and her methods of dispelling disease. It has no doubt been the experience of many of you that you have had a patient whose life seemed to hang merely by a thread. As you approached his home on your morning visit it was a great relief to notice that there was still no crepe on the door. As you entered the home you were greeted with smiling faces and were told that the patient had fallen into a peaceful slumber which had continued for a number of hours and had awakened perfectly rational. Now this is precisely what nature will often do, especially if she is aided by the timely administration of proper remedies.

But such a favorable turn can scarcely be expected if the patient is kept on the verge of convulsions with enormous doses of strychnia. In fact the patient's destiny under such treatment would seem to hang on the question of whether he is immune to the lethal action of the drug or not. I have seen several cases in which the discontinuance of the strychnia and the administration of an opiate were followed by the most happy results.

French neurologists have recently advanced theoretical conclusions on the subject of cerebral disease which may lead to a solution of the problem we have now under consideration. They have added to the nosology of cerebral affections a distinct disease which they name "Meningism." They define this disease as a morbid state characterized by a meningitic syndrome without intracranial inflammation. They recognize three varieties of meningism, the reflex, irritative and toxemic. The latter is probably the form of disease which occurs in pneumonia and in the course of other acute infectious diseases. It is gratifying to find a name which expresses the pathology of the disease at least in a negative manner, and it is to be hoped that such glaring confessions of ignorance as the term "pseudo meningitis" and "meningeal irritation" will disappear from medical literature. It of course requires quite a fertile imagination to conceive of a meningitis without an inflammation and its attendant lesions, but we may form a conception of a meningism in which the disease processes are limited to circulatory disturbances; or to the action of a special toxine which acts upon the cortical or subcortical cells producing the characteristic phenomena of the disease without any evidence of inflammation.

An analogous condition is found in those fulminating cases of cerebro-spinal meningitis where the autopsy reveals no lesions other than an intense congestion. It is highly probable that a hyperemia exists in meningism which would result in inflammation if the condition continued for a sufficient length of time. We had two fatal cases in our experience, but were not granted the privilege of an autopsy. We had, however, formed the conclusion that in those instances where paralytic and pressure symptoms manifest themselves and death results must be cases of meningitis, while those in which all cerebral symptoms vanish when the fever subsides are typical cases of meningism. We are assured though, by writers who are authority on this subject that our conclusions are not correct, but that cases of meningism may die without there being any discoverable meningeal lesion. We are therefore justified in the inference that the term meningism stands for a cerebral syndrome which is as yet veiled in obscurity. Dupré very aptly says: "The forms, acute or chronic, cerebral or spinal of meningism, are of nice diagnosis and of reserved prognosis. . . . The pathology of these 'accidents,' inexplicable by the negative results of autopsies, seems attributable to an action exerted on a cerebral cortex, hereditarily predisposed, by poisons of external, internal or microbic source. . . . The solution of the pathogenic problem is reserved to the technic of the future which will demonstrate lesions invisible to dynamic pathology."

CLINICAL NOTES

A CASE OF PEMPHIGUS.

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Among the various skin troubles affecting children, the erythemato-bullous and bullous eruptions certainly offer points of very great interest. In considering them one's attention is drawn to their severity, chronicity and obstinacy. We usually find that children so affected become anemic, feeble, less resistant to the usual diseases of infancy and childhood, and even if they recover from the attack, they are left in so prostrated a condition, that the utmost care only will make them regain their normal strength.

As the bullous eruptions are comparatively rare it seems to be of interest to report the following case of pemphigus, which came under my personal observation and care at the Lebanon Hospital Dispensary.

L. T., 2 years old, female, was first seen by me on April 18, 1907. The mother, a native of Italy, well nourished, of healthy appearance, gave the following history:

Father and mother alive and well. L. T. is one of four children, none of whom was ever affected with skin trouble until about six months ago. L. T. was suddenly seized with a febrile attack which lasted two days and was quickly followed by the development of a bulla on the lobe of the left ear. During the week following the child became fairly covered with small vesicles and at the same time large bullae appeared, especially upon the abdomen, which condition induced the mother to present the child at the dispensary.

Present status: Child, fairly well nourished, but anemic, shows on the whole body from the scalp to the toes vesicles, pustules and bullae ranging in size from pin points to pigeon's eggs.

The vesicles are round, discrete, rising abruptly from the skin, contain a clear fluid not on an inflammatory base, excepting those which turned pustular. On the abdomen between the umbilicus and the ensiform cartilage are a few confluent pustules, some of which have broken down, discharged the contents and are now covered by a crust.

On the scalp a number of dried-up pustular bullae and a few recent ones can be observed.

Directly in the centre of the forehead a large bulla surrounded by vesicles. On both temporal regions a few vesicles and the remains of a former bullous crop can be distinguished.

On the lids crusting and a few recent small bullae.

The right eye in the inner and outer canthus showed a number of small clear vesicles on a non-inflammatory base, the same condition prevailing on the upper and lower lids.

The chin entirely covered with vesicles of different size, some becoming pustular and others in a broken-down state. While the sternal region was comparatively free and the axillæ showed only a few lesions, the abdomen was fairly studded with smaller and larger sized bullae, in greater part containing clear fluid, the fluid of a small number, however, beginning to become turbid.

The upper part of the arms was rather free, the forearms and hands (dorsa), down to the interdigital spaces were covered with innumerable vesicles and smaller and larger sized bullae.

The same condition also was observed on the lower extremities. Most conspicuous were two large bullae on the anterior surface of the left leg immediately below the knee.

These bullae were 3 inches in length by about 1½ inches in width containing clear fluid and they were tensely filled.

Over the heel of the right leg the remains of a large bulla could be seen.

The mucosa of the mouth showed numerous fine vesicles, few broken down, especially on the inner surface of the lower lip.

At no time did the bullae show any tendency to become hemorrhagic. Scratch marks were absent, showing no tendency of pruritus, which fact was borne out by the mother's statement.

The diagnosis of pemphigus was arrived at. On account of the rarity and severity of the case, it was shown at the May Meeting of the Manhattan Dermatological Society, where my diagnosis unanimously was confirmed.

The internal treatment with arsenic and externally with mild and soothing applications seemed to influence its progress favorably, inasmuch as the child is gaining in strength, only individual new lesions appearing at the present time.

While I am not inclined on account of the presence of a few lesions to call the case an acute one, I believe it, however, judging from the later absence of constitutional symptoms and the increase of strength, to be of a benign character, which may, *cæteris paribus,* lead to an uneventful recovery.

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PEDIATRICS

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EDITORIAL

WHAT CONSTITUTES A PRACTICAL MEDICAL PAPER?*

Comment is freely made on the character of articles appearing in medical journals. They are chiefly criticized as deficient in practical qualities; in failing to furnish definite information leading to the solution of clinical problems. This is true not only of those general in character, but also when written by, or for, those interested in specialties. Authors naturally, and perhaps properly, aim to achieve originality, to offer novelties in technic, in treatment, or to put forth the results of patient research. All this is as it should be, and the contribution to science thus recorded becomes a credit to the diligence and capacities of a most laborious group of observers.

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*Published in the Monthly Cyclopedia of Practical Medicine for September, 1907.

There is an impression broadly prevalent, erroneous in my judgment, that it is not worth while for active practitioners, untrained in literary, laboratory or hospital methods, to publish their experiences. When this is done, succinctly and clearly, especially when well systematized and grouped, there is thus furnished excellent data from which others may deduce generalizations leading to the establishment of truths.

There will never be a time when we can afford to ignore, when indeed we shall fail to profit largely by, what Sajous has so emphatically stated to be valuable scientific experimentation in the use of drugs. This experimentation is not that of a reprehensible sort, as may well be asserted of some kinds performed in the laboratory. It is the inevitable, the praiseworthy, attempt to test in mass the recommendations of those who have carefully formulated and made deductions from appropriate data.

It is essential that we put to concrete proof rational deductions, and upon the human being. Medical men are entirely willing to subject themselves to similar tests, as daily history shows. In many instances serious damage or death has thus resulted to themselves, sacrificing valuable lives. Not so when our patients are thus utilized; they are never tested so radically. If the vast army of intelligent, well-informed, careful practitioners with which America is furnished, yet who remain silent as to print, would keep accurate notes of their findings by placing them on record, they would aid greatly in elevating the position of medical science.

These men have the courage of their convictions. They use their best judgment. They are prepared to stand or fall in reputation upon their daily acts. Why should this not go toward adding to the sum total of knowledge? The aggregate presentation of so definite a subject as the observed effects of a powerful drug, or some well-attested preparation, *e.g.*, digitalin (Merck's Germanic), as has been so ably done by Henry Beates, makes for conviction which has done much toward enabling me to save several lives. So of the use of thyroid extract, recommended by Sajous in bleeders, hemorrhagic states, etc.

It seems to the writer that the most patent deficiency in our writings is the inadequate presentation of fundamental principles, in definite formulations. To be sure, the admirable custom is growing for authors to place at the end of an article a summary of conclusions. Many times this is the only part read; if absent, the subject is often slighted or woefully misconceived. It requires some skill and an orderly mind to pick out the tenable formulations, the acceptable conclusions. The subject is better presented by reducing these to definite headings.

In text-books this is seldom done as completely as it should be. That medical paper is most practical which states the proposition fairly, presents the facts concisely, analyzes these clearly, estimates the underlying points, physiologic, pathogenic and other, accurately, builds up the argument logically, deduces conclusions: (1) those obvious or inevitable, (2) those reasonably certain, (3) those justifiably inferential, or (4) possible.

If treatment is the theme, it is well to proceed on much the same lines, giving various factors involved their due place. It is well to rehearse the outline of physiology or the organ or system under discussion, or the physiologic bearings of constitutional features in accord with the best light or one's own experience; treat the facts observed, in sequence, cause to effect; and finally to present personal views as to explanation of remedies or methods of application. If any special views are held, differing materially from those ordinarily prevalent, it is desirable to make the argument strong, based upon a sure foundation of physiologic truth, not merely current text-book statement. By this is meant not merely those views expressed in text-books on practice and the like, but derived from physiologists of ample certitude, or those who have fortified their knowledge by drawing from similar incontestable sources.

A large mass of otherwise good material is vitiated by arguments based upon the acceptance of statements of "authorities" who themselves, nevertheless, failed to sift the findings which are accepted and loosely reasserted.

The reading public want, they earnestly desire, practical articles. These need not be long. Brief citations readily suffice; but when employed, the utmost care should be exercised that the statements utilized are sound, and deductions logical. Much of the "experimental" work, at least laboratory findings, is of doubtful utility, until they again are revised by yet other and critical persons. Unless all defective experimentation is excluded, false conclusions are reached, misleading rules become perpetuated. One form of "practical article" is greatly needed (or certainly more of them), in which shall be portrayed well-defined verities, legitimate finalities, theorems, precise rules of guidance along the lines of exact biologic reasonings. To be sure, they may not be easily construed, but are altogether possible. Credit, fame, rewards, would accrue in proportion as they should be well done. We have asked too persistently for novelties; let us learn also to welcome and appreciate sound reasoning on the wealth of data already in our hands.

The material from which "practical articles" can be constructed is plentiful. It is only necessary for the "reading public" to voice their demands, to make plain their approbation of accurate literary work and expect less good from the accounts of mere rarities.

J. MADISON TAYLOR.

ABSTRACTS

Some Points in Infantile Tuberculosis.—L. Emmett Holt (Arch. of Ped., Sept., 1907) says that we have not appreciated the frequency of this condition for the reason that we have not looked for it systematically, *i.e.*, to examine the sputum of all infants who have been exposed to infection, and the use of the tuberculin test.

Out of 67 cases treated in the Babies' Hospital the diagnosis of pulmonary tuberculosis was made by finding the bacilli in the sputum of 54 of the cases; post-mortem 10; one had tuberculous meningitis; one reacted to tuberculin, and one had the typical clinical signs. While infants do not expectorate the following method was used to obtain the sputum:

"The method at present followed, and the one which has given the most satisfactory results, is to excite a cough by irritating the pharynx, and then to catch the sputum brought up into view, upon a bit of gauze or muslin. The cough may be excited by a spoon or a tongue depressor, or better, by a small bit of muslin in the jaws of an artery clamp. Upon this the secretion is easily secured when it is brought into view by the cough. Muslin is better than gauze or absorbent cotton. Swabs prepared as suggested are placed by the child's bedside and, when the nurse notices a severe paroxysm of coughing, the child is picked up and, if possible, the sputum is obtained. Inversion during the paroxysm of coughing sometimes causes the infant to discharge a considerable mass of mucus into a sputum cup. By the procedure mentioned it has not been found more difficult to obtain good sputum for examination than in corresponding stages of the disease in adults."

It was impossible to obtain the source of infection in all the cases, but in 21 cases it was traced to the parents; 6 others from another member of the household.

In admitting all children to the hospital if there is the slightest suspicion of tuberculosis in either of the parents the sputum is examined, and if this is negative the tuberculin test is used, the results being most satisfactory.

In 42 cases of tuberculous meningitis examination of the cerebro-spinal fluid showed the bacilli in all, the fact developed that the late punctures showed the bacilli more often than in the early stages of the disease.

The sputum of these 42 cases showed bacilli in 22, though out of this number there were only 5 who presented any physical signs in the chest.

Eczema Infantilis.—John N. Upshur (Amer. Journ. of Dermatology, Sept., 1907). The writer strongly recommends in regard to treatment to investigate not only the skin lesions but also the habits and diet of the mother or wet-nurse. He is also sure that the disease is sometimes due to some defect in the infant's clothing (for example, dyes), or to cosmetics, soaps, lotions, etc. In very early life vaseline, rubbed on the skin after bathing, might act as an irritant. The author recommends instead olive oil, lard or almond oil. In the diet of the mother all acids, especially acid fruits and vegetables, should be eliminated. Also alcohol in any form. The local treatment of the eczema depends upon its variety, whether the lesion is moist and weeping or dry and scaly. The intense itching must also be relieved, as it interferes with successful therapy on account of the child's scratching, and so adding infection as a complication, therefore tying the patient's hands is imperative. The actual treatment then is dietetic, seeing that enough and proper food is taken and well digested, keeping the bowels open with calomel is necessary, sufficient water daily, acids and sweets avoided.

In the moist lesions, cleanliness is of utmost importance and as plain water is undoubtedly irritating, therefore the author recommends warm flaxseed tea, or bran, adding bichloride of mercury (1:6,000), or boric acid, drying the skin with sterile gauze and dressing with a dusting powder of zinc oxide or talcum containing salicylic acid. It is also necessary to exclude the air as much as possible. In the dry and scaly variety ointments are indicated. Regular rest and sleep are important, for which purpose the bromides act favorably. Finally the author recommends a guarded prognosis, as some slight error in diet or imprudence in another direction may cause a relapse.

A. Rostenberg.

Digestion and Feeding in Infants.—Fordyce (Scottish Medical and Surgical Journal, Sept., 1907) deprecates the indiscriminate administration of artificial foods to infants under 9 month of age and considers that prior to the first dentition, they should be regarded as drugs.

He considers the dilution of milk with water the simplest of methods in reducing the percentage amount of proteid in the fluid so that the amount present may approximate more nearly to that in human milk, but that for use for any length of time the dilution should not be more than one part of milk to two of water. His results of laboratory experiments lead him to believe that dilution of milk does not increase the consistency of the curd when ingested, as has been stated by Colton and Chapin.

E. F. C.

Relapses in Diphtheria.—J. D. Rolleston (British. Journ. of Children's Diseases, Aug., 1907). In 1859 Michel Peter comments on the severity of the relapse and of its frequent occurrence, but in later years it appears that "in repeating itself diphtheria lost its gravity." All writers agree that relapses occur in about 1.5 per cent. By relapse is meant the recurrence of the membrane with constitutional symptoms before the patient is discharged cured. Out of 1,300 cases all relapses were under 10 years of age. They were also found to occur most frequently following mild primary attacks. This, perhaps, may be explained by the fact that the severe cases received large doses of antitoxin. The relapse cases reacted rapidly to the serum, a striking feature being the frequency of serum rashes, 94.7 per cent., their early (1 to 3 days) appearance and the aggravation of the usual serum phenomena after serum re-injection. These rashes were quite severe and were often associated with a marked edema.

Dr. Rolleston gives the following summary: (1) Relapses occur in a little more than 1 per cent. of all cases of diphtheria. (2) They are less frequent than late tonsilitis in convalescence from diphtheria. (3) They do not occur before the third week. (4) The frequency of serum rashes after re-injection is much greater, their appearance is earlier, and their phenomena more intense than usual. (5) Relapses must be distinguished from angina redux, scarlet fever, and late tonsilitis. (6) They are usually milder than the primary attack. (7) Comparatively small doses of antitoxin should be employed in the treatment of relapses. (8) The causation of relapses is obscure.

The Use of Guaiacol, Locally Applied to Control the Temperature of Pneumonia and Allied Conditions in Children.—Scales (New Orleans Medical and Surgical Journal, Sept., '07), from observations on a limited number of cases in which he has tried this form of treatment, says, |1. That guaiacol when applied locally in oily solution, in quantities of from 10 to 30 drops, according to age, will reduce the temperature of pneumonia in children with rapidity, safety and certainty; (2) That it possesses peculiar efficiency in certain diseases of the broncho-pulmonary system, and seems to exert a favorabl influence aside from its antipyretic action; (3) That if it is both effective and safe, its cheapness and ease of application would make it an agent of great value.

He further states that his results of its use in high fever from malarial infection have been indifferent, which would suggest that its action in pneumonia is not solely antipyretic in nature, but an antiseptic toward which the malarial parasites are resistant. E. F. Crofutt.

Acute Rheumatism in Children.—C. O. Hawthorne (The British Journ. of Children's Diseases, Aug., 1907) says that few subjects present so many questions for debate, that it has only been within the past few years that the frequency of rheumatism in childhood has been recognized, notwithstanding the fact that "the most complete and comprehensive manifestation of the various phases of rheumatism belongs to the period of childhood."

Another general question is, "Why does the picture of acute rheumatism in the child differ so conspicuously from that of the same disease in the adult?" Is it because certain tissues in the child are more susceptible and others more resistant to the rheumatic poison than are the corresponding parts in adults? However, in making the diagnosis, we are confronted with the fact that there is no standard by which we can label various clinical incidents as rheumatic, for instance, in adults there are many causes of arthritis recognized, especially a well-defined febrile disease associated with articular disturbances—affecting, for the most part, many joints—and with abundant sour-smelling perspirations, but in children this symptom-complex is but seldom seen. Continued high temperature is uncommon, joint disturbances are but slight, and free sweating infrequent. There is, however, a class of cases between these two extremes that are no doubt rheumatic, cases that yield readily to anti-rheumatic treatment. These mild cases often cause the most harm, the pain in the joints being so slight that the children are not put to rest, so needful a prophylaxis against endocaritis. In many cases only the joints of the fingers and toes are affected.

The author questions as to "What shall be said of the vast multitude of other phenomena which are not presented as expressions of rheumatism in the early years of life—of tonsilitis, pleurisy, bronchitis, pneumonia, chorea, nervousness, anemia, purpura, abdominal pains, epistaxis, nephritis, erythemas, subcutaneous nodules, phlebitis, enuresis, meningitis, orchitis, periostitis, perilyphlitis, and the rest? For many of these a good case may certainly be made out, at least to this extent, that more or less occasionally they occur with the cardiac, febrile and arthritic evidence of the disease. In such circumstances the conclusion in favor of a rheumatic interpretation is a fairly strong one."

In regard to treatment the writer uses salicin, in moderate doses; also the organic salts of potassium or sodium, until the urine becomes alkaline. Early and prolonged rest is without dougt most effective against cardiac complications; due attention should be paid to clothing, domestic hygiene, and climate.

Observations on Arthritis in Young Children.—Poynton (Edinburgh Medical Journ., Sept., 1907) mentions as varieties gonnoccal, virulent septic, meningococcal, acute tubercular, arthritis associated with pneumonia, acute rheumatism, the arthritis described by Still, hemophilic and syphilitic.

He emphasizes the difficulty in diagnosis as the condition may be a simple arthritis, epiphysitis, or a combination of the two, or as in some cases where there is immobility of the affected limb without any notable arthritic swelling, it may simulate infantile paralysis.

Relative to gonnoccal arthritis he believes the examination and culture of arthritic exudations are imperfect guides in diagnosis for the exciting causes lie in the synovial tissues rather than in the synovial fluid.

Arthritis may be present in meningitis either in the epidemic or post-basic form, as permanent and marked features of the disease and not, as is usually the case, a secondary symptom of comparatively little moment. The effusion in these cases may be either intra- or peri-articular and he compares the intra-articular form with hydrocephalus, the distention of the ventricles of the brain and the distention of the knee-joints suggesting that both conditions are the results of the toxin irritating the lining membranes of the respective cavities.

He considers the tubercular form and the form associated with pneumonia as being rare under five years of age as also is acute rheumatism, although this form may be presented with stiff neck as the only symptom, thereby suggesting spinal caries, but which yield to treatment with salicylates.

The arthritis described by Still is peri-articular in type and characterized by a chronic progressive arthritis, enlargement of the spleen, enlargement of the lymphatic glands and resulting in deformities. E. F. Crofutt.

Physical Training as a Therapeutic Agent.—McKenzie (Canadian Journal of Medicine and Surgery, Sept., '07) states that is using physical training in the treatment of deformities such as scoliosis, lordosis and kyphosis, and in those following infantile spinal paralysis, he considers the education of the patient, suspension and the rotation rack the best methods. The education of the patient by persistently directing the attention and effort of the individual to the performance of certain desired muscular actions is the first essential; that this is best accomplished in classes, as it secures associations with and examples of, other persons, such emulation being a great

Suspension he uses by the head alone, with the addition of weights to the body or to the feet, while the patient is still in suspension, the object being to render the spine and its ligaments more supple and to force it toward a straight line. The rotation rack is used in rotary displacement. These methods are not to be used in deformities caused by disease. He deprecates the use of braces, for by exerting continuous pressure they tend to produce atrophy, hinder development and growth, and encourage the patient to lean upon the brace as upon a crutch.

E. F. Crofutt.

Veronal as a Sedative in Diseases of Children.—Dr. Lévai (Budapesti orvosi ujsag, 1907, No. 1). Desiderius Lévai, of Budapest, states that the results which he obtained for a number of years from the use of veronal with adults led him to use it very extensively in children's diseases. He has found that children bear the remedy very well, and, by reason of its physical and chemical properties, it is splendidly adapted to pediatric practice. In diseases of the nervous system it is particularly applicable in meningitis, in convulsive diseases, particularly chorea, and in the unrest accompanying dentition and intestinal disturbances. He quotes a number of cases in which veronal proved of service to him. In three cases of tuberculous meningitis he found that bromides and chloral were of very little service in controlling the convulsions, but veronal was effective. Naturally, it had no influence upon the fatal outcome, but it made the patients more comfortable, and was useful in arriving at a diagnosis. In eight cases of infantile eclamptic convulsions excellent results were observed in three cases. In one it was of no service whatever, but the patient recovered entirely after the use of santonin, showing that the convulsions were due to intestinal parasites. In four cases of troubled, dreamy sleep, associated with nightmare, veronal was of great service, and in a number of cases of difficult dentition he has found it valuable in quieting the nocturnal restlessness. In those cases in which there is much pain, the remedy has proved less valuable. He employed it in one case of minor chorea, but was unable to follow the later history of the case. Good results were obtained in infantile hysteria, in an eight-year-old girl particularly. The doses recommended by Lévai are as follows: In children up to one year of age, one-quarter grn.; from one to three years of age, three-eights grn.; from three to five years, one-half grn.; from five to seven years, five-sixths grn.; from seven to nine, one and one-half grn.; from nine to 11, two and one-half grn.; and from 11 to 14, four grn. The veronal in all of these cases was given in warm milk.—The Post-Graduate, Sept., 1907.

Rachitis, Importance of Early Recognition and Treatment of.—T. S. Southworth (Medical Record, June 15, 1907). It has been claimed by some that all bottle-fed infants are rachitic. This does not apply to those whose food is properly controlled, or whose digestion is good. Rachitis develops because of parental blindness in many instances, the parents failing to recognize peculiarities in the child which need special attention. Many times, too, physicians fail to recognize the early symptoms of the disease. Rachitic deformities are often far advanced before medical aid is sought, and the early signs are often unrecognized and untreated. Evidences of rachitis may easily be overlooked upon superficial examination. There is great variation in the incidence of the symptoms. While rachitis may undoubtedly begin before the fifth month, yet in the writer's experience this was exceptionally the case. The grouping of the symptoms is also subject to great variation. Rachitis is of very frequent occurrence among infants. Acute rachitis is a menace to infancy, and rachitic deformities a menace to the adult. Prophylaxis should therefore be strongly urged. Racial predisposition has been noted, negroes and the poor children of foreign parents seeming particularly susceptible to the condition. The dietetic treatment in the first and second years is of great importance. The use of cod liver oil and phosphorus, singly or together, is advocated. Phosphorus is of great value in cutting short the acute and progressive symptoms of the disease.—Monthly Cyclopedia of Practical Med., Aug., 1907).

Some Physical Defects in Children and Their Effect upon Development.—Bock (Buffalo Med. Journ., Sept., '07) pleads for the routine systematic examination of all children by the family physician, believing that the causes of backwardness and faulty development can, in nearly 65 per cent. of cases, be traced directly to some disease of the eye, ear, nose, throat or gastro-intestinal tract.

In support of his views he gives the results of examination of 164 Rochester school children (unselected) of which 145 were found to have enlarged tonsil, 136 had adenoids, 46 often had earache, and 82 had bad teeth, besides showing the occurrence of fifty other physical defects.

He cites cases among these children where there has been a correction of these defects, which have shown decided mental and physical improvement.

E. F. Crofutt.

Acquired Infantile Myxedema.—By Dr. Buschan (Encycl. Jahrb. d. ges. Heilkunde 14, 1907). This pathological condition is due to an acquired loss of function on the part of the thyroid gland, not malformation or aphasia of the organ, as in the congenital variety, but the suppression of an originally functionating gland, as has been demonstrated by autopsy findings (remnants of the thyroid in the form of connective tissue strands, with or without fatty infiltration). The clinical picture resembles in a general way that of congenital myxedema, but the symptoms are, as a rule, less well marked. The pathological phenomena vary in gravity according to the period at which the loss of thyroid function has begun. In those cases where the thyroid gland has been suppressed during the first two years of the patient's life, the clinical picture does not differ essentially from congenital myxedema. The defects are less considerable in those cases where the trouble does not begin until a later period of childhood. The affection then becomes noticeable through an arrest of the physical growth and the intellectual capacity, even by retrogression of the latter. The phenomena on the part of the osseous system are less pronounced in those cases where the large fontanelle had already closed, or the eruption of the first teeth had already taken place when the loss of thyroid function becomes established.

For the treatment of the myxedematous condition, only one method enters into consideration, namely, the substitution of the missing thyroid function by the administration of thyroid gland preparations. This method of treatment has been sufficiently studied and tested in myxedema of adults and children, congenital as well as infantile. Very satisfactory and sometimes positively brilliant results have been obtained in this manner, as shown by a long series of illustrative cases, the improvement being both physical and intellectual in character.—The Post Graduate, Sept., 1907.

The Operative Treatment of Diphtheritic Laryngeal Stenosis in Infants.—W. Moltschanoff (Jahrbuch f. Kinderhk., Jan. 9, 1907, p. 64) tabulates the cases of laryngeal stenosis that were admitted to the Moscow University Children's Clinic during the years 1895-1904, when they were treated with antitoxin injections, and intubation when necessary. Intubation, according to the author, is indicated on the first appearance of slight permanent cyanosis of the lips and retraction of the soft parts of the chest. Three hundred and eight cases were admitted, 69 of whom died—a mortality of 22.4 per cent.—193 cases were intubated. Of these, 21 were not above one year of age; 10 of the intubated infants died—a factor.

mortality of 52.4 per cent. The complications were as follows:—Bronchitis, 2 cases; catarrhal inflammation of the lungs, 3 cases; laryngeal ulcer due to pressure of the tube, 1 case; convulsions, 1 case. In 3 cases there was difficulty in inserting the tube, but even in an eight weeks' old child intubation was accomplished after repeated attempts. No primary tracheotomy necessary. In these the mortality was 62.5 per cent. No cases of obstruction of the tube were seen, and in only 2 cases was feeding difficult. The author concludes that even in young infants intubation is preferable to tracheotomy. —Arch. of Ped., Sept., 1907.

A Salt Free Dietary in the Treatment of Scarlet Fever and Acute Nephritis.—M. Delearde (L'Echo Médical du Nord, Jan. 20, 1907, p. 25). Salt in small quantities has been often shown to be indispensable to the health of the normal body, but in the way it is ordinarily employed (as a condiment) it passes as waste product through the urine and feces. Most articles of diet contain in themselves a sufficient quantity of salt. If the kidneys become affected and their activity diminished, excess salt is stored in the tissues, which then call for water as a solvent, thus causing edema.

While milk diet is not to be wholly condemned, the writer calls attention to the fact that in giving a sufficient quantity to keep up nutrition, a considerable amount of salt is ingested, which may act as an irritant to the kidneys, and, furthermore, milk is not regarded as sufficiently sustaining during the period of convalescence in scarlet fever when the patient should be fortified against the ravages of secondary infection. During the stage when the throat is red and swollen, porridge, broths and eggs may be given, and later, meats, fish, vegetable purees, eggs and bread, all unsalted. Diuretics are administered as a matter of routine. A series of cases successfully treated according to this regime are cited by the author.—Arch. of Ped., Sept., 1907.

Hereditary Syphilis, Spirochaetes found in the Blood.— Petit and Minet (L'Echo Méd. du Nord, June, 1907) record the case of a child, aged five months, who had generalized edema, nasal discharge, enlarged abdomen, with prominent subcutaneous veins. The liver was enlarged and hard, and the spleen palpable. The child died of melena and hematemesis. The liver weighed 347 grms., was hard, and of the color of chamois leather; there were no gummata. Microscopically the hepatic tissue was profoundly altered. There was a generalized fine fibrosis, and in patches complete fatty degeneration of the parenchyma, resembling that seen sometimes in infectious diseases. The blood showed 1,890,000 red corpuscles and 18,600 white. Polynuclears 30 per cent., lymphocytes 36 per cent., large mononuclears 18 per cent., myelocytes 4 per cent. This resembles the blood-count of the pseudo-leukemia of von Jaksch. The Spirochaeta pallida was also found in the blood from the heart, which was centrifugalized and stained for twenty-four hours by the Giemsa method. Delearde has also recently demonstrated the same organism in blood obtained during life from a superficial vein and stained by the method of Nattan-Larrier. These two successive cases show that the blood of infants with congenital syphilis contains the spirocheta.—The British Journal of Children's Diseases.

Inorganic Late Systolic Pulmonary Murmurs in Infancy and Childhood.—Samuel McC. Hamill and Theodore Le Boutillier (Amer. Journ. Med. Sci., Vol. cxxxiii., p. 55) again call attention to the frequency of this murmur in young children and the ease with which it is mistaken for an organic murmur. They first define a cardio-pulmonary murmur as a short systolic whiff-like murmur head loudest at the apex, whence it is transmitted to the left; it is heard best or only towards the end of inspiration. On the other hand, the late systolic pulmonary murmur under consideration is a long blowing post-systolic murmur which never obliterates the first sound, and which is heard best over the second or third left space; it is increased by exercise and is much loudest in the recumbent posture, and towards the end of expiration; there is no accompanying change in the size or position of the heart. A loud bilateral venous hum and arterial murmurs accompany this murmur, but anemia is not necessarily present. The authors found this murmur in two-thirds of eighty normal children examined; it is as frequent under the age of five as over. It has no pathological significance, but is important in that it may be mistaken for organic disease. It is most probably due to distension of the conus arteriosus.—The British Journal of Children's Diseases.

BOOK REVIEWS

TREATMENT OF DISEASES OF CHILDREN. By CHARLES GILMORE KERLEY, M. D., Professor of Diseases of Children, New York Polyclinic Medical School and Hospital, etc. Octavo volume of 597 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1907. Cloth, $5.00 net. Half morocco, $6.50 net.

The author is much too modest in his preface when he states that this work "has been prepared for the general practitioner of medicine" and not written "with a view to supplying the needs of either the specialist in children's diseases or to the undergraduate student." It is as of much value to the two latter as the former. Dr. Kerley is especially well equipped by reason of his researches and vast clinical experience to prepare this contribution to Pediatrics.

Too many writers touch but lightfully and refer only in general terms and loose directions as to treatment. This fault the author has avoided and he expresses himself concisely, and what is more to the point, definitively on the therapeutics and management of the various diseases.

It is impossible to select any one subject that deserves special commendation, for all topics have been treated with the consideration they deserve. However, the chapter on "The Delicate Child" is most interesting.

This condition is so often met with that frequently not enough time is taken to go over the patient thoroughly, but a tonic is prescribed and the mother told to return with the child in a month or more. The author states that they are usually under height, always under weight, and have so many characteristics in common that they constitute a class to themselves, either being born with a reduced vitality or through faulty management, improper feedings, acquire it. By proper regulation these children make far better adults than if no such effort had been made. One must make a thorough examination, with observations taking, perhaps weeks, eliminating tuberculosis, syphilis and malaria; or, properly treat all causes, such as adenoids, phimosis, adherent clitoris, vaginitis or parasitic and irritant skin lesions. When all this has been done we are in a position "to lay down definite rules of management."

Diagnostics of the Diseases of Children. By LeGrand Kerr, M. D., Professor of the Diseases of Children in the Brooklyn Post Graduate Medical School; Pediatrist of the Swedish Hospital in Brooklyn; Attending Pediatrist to the Williamsburg Hospital. W. B. Saunders & Co., Philadelphia.

A new work on Pediatrics, by a comparatively little known author, deserves careful scrutiny. In the present instance, we are pleased to say, it passes under the critical idea and comes out with approval. In fact, the work is a very commendable one, and its author is to be congratulated on being able to present so practical a volume in the space utilized.

In so large a work it is not unusual to find slips. Thus, in saying that paralysis is *often* associated with chorea, the adjective used should be *infrequently*. Thus a review of the Charité statistics shows almost no record of paralytic chorea, and in the Vanderbilt Clinic statistics—the only American ones with which we are acquainted—paralytic chorea has not been recorded during the last five years, and there have been 1,000 cases of chorea, showing that it is an unusual condition, and not a common one.

The work is particularly useful for the student and for the busy practitioner; it is sketchy, practical, and of the *multum in parvo* type.

Diagnosis is the main thing in all medical work; without it rational therapy is impossible, and it is a pleasure to commend a work which sticks to methods of observation for diagnostic purposes alone.

Too many physicians want to know "what to do for a patient" before they really know "what is the matter;" given the latter, they should be able to reason out the former. Diagnosis requires observation; therapy, thought.

How to observe, and observe well, is the rarest of acquirements, and anything that stimulates observation is commendable.

Atlas and Epitome of Diseases of Children. By Dr. R. Hecker and Dr. J. Trummp, of Munich. Edited with additions, by Isaac A. Abt, M. D., Assistant Professor of the Diseases of Children in Rush Medical College in affiliation with the University of Chicago. With 48 colored plates, 147 black and white illustrations, and 453 pages of text. Philadelphia and London: W. B. Saunders Company, 1907. Cloth, $5.00 net.

This valuable little book is another of the atlases that has lately come from the press of Saunders. The text is remarkably concise without losing clearness. The illustrations, both black and white, and more especially the colored plates, are anatomically and artistically correct. The student, and the doctor far removed from clinical centers, will find this volume of great service for frequent reference.

PUBLISHERS' ANNOUNCEMENTS

It is with pleasure that I add my testimonial to the great value of Valentine's Meat-Juice in my hands during the recent epidemics of influenza in this city, sustaining, as it did, the vital powers of the patients beyond the crisis and through convalescence without experiencing any degree of prostration. I find Valentine's Meat-Juice one of the best tonics and nourishments during the transportation of the injured, it being always ready for immediate use and acceptable to the stomach.—J. W. Dalrymple, M. D., Medical Director Riverview Sanitorium, N. Y.

I have obtained excellent results from the use of Valentine's Meat-Juice in the nourishing of backward children, and in my own case, my stomach, which had been greatly weakened by a serious attack of influenza, has been brought to order again, primarily by the use of Valentine's Meat-Juice, so that I now feel quite well again.—Prof. Dr. Stetter, Lecturer on Surgery and Otology, University of Königsberg, Germany.

Having been for seven weeks confined to my room with the late prevailing epidemic of influenza, and my sister also very ill, we were very glad to avail ourselves of Valentine's Meat-Juice. We found the preparation most agreeable to the palate, and renovating to strength, and both of us being in very advanced age (78 and 76 respectively), I think we ought in common fairness to attribute our full restoration to health and vigor greatly to the invigorating power of the Meat-Juice.—Robt. E. Gaye, M. R. C. S.; L. S. A., London, England.

I have regularly used Valentine's Meat-Juice for many years and consider it the most nutritious and at the same time most stimulating and agreeable food ever brought before the profession. In all cases of exhaustion from acute and chronic diseases and in bad gastric troubles I have implicit confidence in its therapeutic value, and in the treatment of influenza I have in Valentine's Meat-Juice a "sheet-anchor." I personally take it and recommend it to others in health while cycling, racing and in other athletic sports. It is a well-known preparation in Scotland.—Francis Wm. Grant, M. D.; B. Sc.; Surgeon Gray's Hospital, Elgin, Scotland.

COHEN reports six cases of anemia pseudo-leucemica infantum (von Jacksch). He considers this condition a clinical entity. It appears mostly at the end of the first or the beginning of the second year. Of his cases, one was due to heredo-syphilis, one to congenital debility (in a seven-months child), and four to trophic disturbances characterized mainly by rachitic lesions more or less severe. He thinks, therefore, that there may be a possible relationship between peudo-leucemic anemia and rachitis, although cases have been reported without any traces of rachitic lesions. The blood picture is characterized less by a marked leucocytosis (which is never above 60,000), than by a pathologic increase in number of some special variety of leucocyte (lymphocyte, myelocyte, mast-cell, eosinophile).

H. T. RADIN.

Le Progres Medical, June 8, 1907.

WIGART reports several cases of fulminating meningitis of otitis origin. This condition is but little recognized. It is apt to occur in those cases where the natural barriers between the brain and the middle ear are either congenitally deficient or else destroyed by disease. In one case, four days after an operation for mastoid disease, the symptoms of a very acute and severe meningitis suddenly supervened. Diagnosis was confirmed by autopsy. The mastoid cells were full of pus, which had penetrated the thrombosed lateral sinus. The vessels of the pia mater were intensely congested.

The prognosis is fatal. No treatment is of any avail. Lumbar puncture has been tried, but is valueless. The infection is too overpowering.

Prophylaxis is very important. Especially as in children the separation between the meninges and the middle ear is so slight. All ear suppurations should be scrupulously attended to.

H. T. RADIN.

PEDIATRICS

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ORIGINAL ARTICLES

EPIDEMIC ANTERIOR POLIOMYELITIS.

By Godfrey Roger Pisek, M. D.

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A critical study of the character of the cases reported in the epidemics of acute anterior poliomyelitis both in Europe and in this country, in conjunction with the number of acute cases we have been permitted to study during the recent large epidemic in and about New York City, forces one to the conclusion that the disease in the epidemic form assumes a symptomatology at variance with our accepted ideas; its course is manifestly different and the prognosis as to functional recovery, much better than in the sporadic cases hitherto coming under our observation.

This epidemic which appeared in New York City, about June last, is now, in October, just beginning to show a decrease in the number of cases. The lower part of the Hudson River valley and the surrounding lowland sections, suffered from this dread disease. The geographical and atmospheric conditions in our own locality, coincided with the other large epidemics; those of Medin in Stockholm and Caverly in Vermont; namely, a valley with a period of prolonged dry weather.

The general practitioner, and equally so his brother specialist had previously few opportunities to study this disease in its acute stage and as a consequence cases were often diagnosticated as rheumatism, nephritis or meningitis. It was the prominence of certain symptoms which will be referred to below that led to these errors. The general practitioner depended on his text book knowledge of the disease which had become dim and hazy from disuse, and when suddenly confronted with the malady, perhaps in a form at variance with any other he had ever seen or heard about, it is not strange that errors were made. One case that came under my observation was sent from doctor to doctor, and finally chloroformed for purposes of examination and diagnosis. The writer was permitted to study carefully and critically twelve acute cases of anterior poliomyelitis in private practice, and many more that had passed the acute stage, were seen in the Hospital and Dispensary.

It is not the purpose of this paper to give in detail the histories and symptoms of these cases, but to point out their dissimilarity from the ordinary type of the disease. The children attacked were from 8 months to 4 years of age. It seems to be more than a coincidence that all but four of these children had but recently recovered from diseases ascribed to bacterial invasion, as gastro-enteritis, pneumonia, follicular tonsilitis and pertussis.

Although the direct etiological factor has not been isolated, the occurrence of the disease in epidemic form and the fact that more than one child in a family may be attacked, (a sister of one of the cases seen by the writer was attacked within 24 hours) gives strong presumptive evidence of the presence of a bacterial agent.

Geirsvold and Lie found an organism closely resembling in characteristics the micrococcus tetragenous, and these findings have the confirmation of Wethloff who obtained a micrococcus in pure culture. The recent pathology of this disease which shows that the entire gray matter is involved in an interstitial inflammation, that changes in the ganglion cells are secondary changes, and that the anterior corua are affected by the disturbed blood supply, is in accord with the types of the disease seen in the epidemics. Except that we may go further and say that the inflammatory changes have in certain cases primarily involved the cerebrum and medulla, and finally caused paralysis by invasion of the cord.

It is to be hoped that the bacteriological examination of the blood, cerebro-spinal fluid or the feces will throw further light upon the etiological factor.

The distinguishing features of the epidemic form, are the number of fatal cases, the prominence of pain as a symptom, the absence of convulsive seizures initiating the attack, the cerebral symptoms, the unusual parts of the body involved, and the rapid functional recovery in a good proportion of the cases. The one symptom that perhaps produced the greatest amount of confusion in the recent epidemic was pain. This was a permanent symptom in every case under our observation, and undoubtedly led in many instances to the mistaken diagnosis of rheumatism or neuritis. The classical descriptions of the disease as given by Duchenne and Charcot do not emphasize this symptom sufficiently. A mild grade of pain is found to persist in certain cases, for a considerable period and may be attributed to the relaxation in the joints which has taken place, due to the atonic musculature.

The cerebral symptoms observed have been so marked as to resemble the initial stages of cerebro-spinal-meningitis. In one of my own cases this uncertainty was cleared up by doing a lumbar puncture. The fluid was found to be sterile. Twelve hours after the puncture there was paralysis of the right upper extremity. After thirty-six hours functional activity had returned. An internal strabismus is the only complication at the present writing.

A fatal case, seen for the first time on the second day of her illness, was marked by an intense bulbar involvement, with dysphagia, dysarthria and paralysis of all four extremities. Many of the children seen have had an involvement of the extensor spinæ group, and these cases especially confirmed the opinion held by Remak that the parts paralyzed were functionally and not anatomically related.

The electrical reactions were a distinct help in establishing the prognosis. The number of cases in this epidemic which showed retrogression of the paralysis in the second week (as distinguished from 4 weeks in the average cases) would tend toward a more hopeful prognosis. One boy two years old, had paralysis in both lower extremities with absence of patellar reflexes, and slightly altered electrical reaction. Three weeks after the onset his functional activity had returned, so that he could walk unsupported, and the patellar reflex was found to be present a week later. Unfortunately we are still groping in the dark as to treatment. It is to be hoped that the capable laboratory workers who have been enabled to study the acute cases from a biological standpoint will point the way toward, or perfect a curative serum.

Upon the theory that we have a toxemia to deal with, treatment should be directed towards elimination. Salines and high colonic irrigations with daily hot baths, have been used by the writer, during the acute stage, the patient being disturbed as little as possible during the intervals of treatment. Just as soon as the fever had subsided and retrogression of the paralysis was in evidence, the patients were given massage and later vibratory treatment.

They should be placed in the open air, and given a nourishing diet to conserve their musculature, and thus aid in convalescence. Orthopedic measures to correct drop foot or overacting muscles should be instituted early. Severe deformities which will demand such methods as Spiller's implantation will undoubtedly be seen as old results, but it is hoped that in view of a better appreciation of the prognosis, the cases will reach the orthopedist, before it is too late. Electricity and remedial measures have been disappointing, and may be in certain cases worse than useless. The bromides have been employed to control the pain in the early days with happy results.

SOME ASPECTS OF TUBERCULOSIS IN CHILDREN.

By John B. Huber, A.M., M.D., Visiting Physician to St. Joseph's Home for Consumptives, New York City, Etc.

Most consumptive patients transmit in their offspring vitiated tissues upon which the tubercle bacillus easily finds implantation. Nevertheless it is an odd phase of tuberculosis that some children of consumptive parents are singularly immune to that disease.[1] They present at birth none of its characteristics nor does there appear to be in them any indication of depraved tissues; they are evidently quite as robust as the offspring of very healthy parents, and present during childhood what seems quite unusual resistance to the agencies by which tuberculosis is engendered.

It appears to me that our modern knowledge of the processes of immunity explains this paradoxic condition—that the specific toxins generated in active tuberculous processes in the parent excite a reaction on the part of the fœtal tissue cells, an active immunity to the disease being thus brought about *in utero*. The process seems akin to that of antitoxin in diphtheria. And the infant thus immunized (in obedience to the law which obtains generally with regard to all infections) becomes during its life resistant to the tuberculous virus.

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[1] Vide: L. F. Flick: Immunity as Against Heredity in Tuberculosis, Journal of Tuberculosis, October, 1899; also H. M. King: A Study in Heredity; In Its Relation to Immunity and Selective Activity in Tuberculosis, New York Medical Record, Oct. 12, 1901.

On the other hand, as I have noted to begin with, the majority of children born of consumptive parents exhibit the more familiar dyscrasia; perhaps in these cases the parental tuberculous processes are dominant or spent (as in tertiary syphilis). The blood of such consumptives evolves no antitoxin; and thin children are born presenting what Roger has well termed the scrofulous temperament. Such children are born weak and sickly. Their skin is pallid, their flesh flabby, inflammations (which tend to a sluggish and subacute course, difficult to heal), occur upon slight provocation in the mucous membranes—phlyctenulæ, blepheritis, coryza, sore lips, apthous gums, stomatitis, congested and unhealthy throats, obstinate bronchitis. The lymphatics are involved; the cervical glands become prominent; naso-pharyngeal adenoids, diseased tonsils, anæmia, slow teething become manifest. Such infants are mouth-breathers, starved for oxygen; the respiratory processes, by which oxygen should be conveyed to the minutest tissues, are deficient. All the metabolic processes are torpid and inadequate for the organism's needs. One finds circulatory lesions, thoracic malformations.

It seems to me that in defining this condition we must continue to use the old term scrofula; there is none other so apt. The only objection to it (a fatal one to many minds) is that it is not "up-to-date." It is abjured as being "obsolete." These children are not born tuberculous, certainly not most of them. Comet does recognize a "tuberculous scrofula" from which term the latter word had best be eliminated; such a condition is a tuberculosis without qualification. He also recognizes a scrofula without tubercle formation and without the presence of the Koch bacillus. And the latter is the pathology in children born with the "scrofulous temperament." For ante-natal bacillary transmission, though it is possible, is probably very rare; the bacillus itself is almost never transmitted by the parent to the offspring. Such a child, therefore, is not born tuberculous; for tuberculosis is a pathological entity conditioned absolutely upon the presence of the Koch bacillus.

The distinction is important, to my mind. If we can maintain the infant exhibiting the scrofulous temperament in an environment essentially hygienic, which is as uncontaminated as is possible by the tubercle bacillus, we may indulge all the greater hope of developing for that child a strong and virile organism.

At any rate it is desirable to realize that in such a case it is not the disease tuberculosis which we have from the beginning to cope with. If upon the vitiated tissues of the infant born scrofulous are engrafted the tuberculous processes, then the disease becomes one much more difficult to eradicate; it becomes the tuberculosis which makes up so largely our enormous infant death-rate.

The upper respiratory passages and the bronchial glands play a large part in tuberculous development. In "inhalation tuberculosis" it is not the air vesicles in which the germ first secures implantation; the bacillus either finds a nidus in or filters through unhealthful mucous membranes from the nerves to the bronchioles. Thence by lymphatic channels are the cervical lymph nodes and the bronchial glands involved; further transmission is by way of the thoracic duct, the right lymphatic duct, the right heart and finally the lung parenchyma, the great respiratory sifter of impurities. The extent to which tuberculous infection is by these channels is undetermined; but clinically and practically it is so frequent that the eradication of all adenoids and diseased tonsils and other like tissue, and the cure of all affections from the nostrils to the bronchioles is very imperative.

The most diverse opinions have been expressed concerning "ingestion tuberculosis"—from the position that there is no such thing at all to the equally absurd extreme that the disease never comes about in any other way. As is generally the case, the truth lies somewhere near the position which the pendulum assumes when it has ceased swinging. We know that the tubercle bacillus has been found in the milk of consumptive mothers, whether or no there has been tubercular mastitis; that milk is in itself a most receptive and admirable culture medium; that the milk of tuberculous cattle contains the bacillus, generally when the udders present tuberculous lesions, but also when there are no such lesions manifest. Infants, moreover, never spit out or emit their sputum or the pathogenic excreta from unhealtny upper air passages. These are swallowed and undoubtedly often induce an ingestion infection. We find tuberculous intestinal lesions and tuberculous glands in the mesentery of infants; but not very often. This does not mean, however, that ingestion tuberculosis is rare; oftentimes, perhaps generally, the Koch bacillus does not find a focus in the intestinal mucous membrane or in the abdominal lymphatics; it is likely to traverse such tissues and to be transmitted through the thoracic duct (tuberculous lesions in this duct are, by the way, not rare) and thence to the lung through the channels mentioned in this paper with regard to inhalation infection.

Evidently, then, ingestion tuberculosis occurs so frequently that we must take it into consideration in every case examined. If the milk given infants is of questionable purity it should be Pasteurized. This could easily be made as simple a domestic function as washing the baby; all that is needed is to buy for a quarter of a dollar a bath thermometer and to heat the milk for twenty minutes at a temperature of 165° F.

There is nothing more striking among the aspects of tuberculosis than the way in which its death-rate begins to be formidable at adolescence. During the first four years of life this disease claims many victims; thence on, however, to adolescence, few children succumb to it. But beginning with the fifteenth year every third or fourth adult white, and every other negro dies of consumption. Yet in childhood, from the fifth to the fifteenth year exposure to tuberculous infection is surely no less than in other years; indeed, it is generally greater than during later periods in life. Evidently, then, there is a latency during these years, foci becoming irritated and tuberculous inflammation becoming manifest in adolescence by reason of the unusual stress and perturbation which the organism has to undergo at that time. There is, then, the extremest and most logical necessity to examine children in the childhood and school-going periods for the detection and removal, so far as possible, of all factors and lesions which might lead to the development of consumption in the adult. To elicit the symptoms already mentioned in this paper; to understand why a given child is fretful, irritable, thoracic, or nervous, easily fatigued, unable to concentrate the attention, pale, feverish and chilly by turns; why there is headache, anorexia, a persistent dry cough, difficulty in swallowing, pain on pressing vertebræ, girdle sensations, frequent urination, irregular movements of the bowels; why such a child is below the average weight; or if it has suffered some very enervating constitutional disease, such as typhoid fever; to discover if there are anatomical deviations from the normal, such as winged scapulæ or weak inspiratory muscles or thoracic malformations; to find the "lymphatic habit," obstructions leading to mouth-breathing, chronic otitis media, reflex muscular spasm, or tender and swollen joints or a painful and distended abdomen—by such careful examination and by scientific prophylaxis may we hope to cut down enormously the dreadful adult consumption mortality.

Malaria in Infancy.—Crespin (La Clin. Infant., June, 1907, No. 11, p. 341), of Algiers, makes an interesting communication on this subject. As in adults, children become infected by the bites of the anopheles, but with regard to congenital or hereditary malaria opinions differ. Bein, Bowzian, and Bellatini have found the hæmotozoon in the fœtal blood, whereas Bignami, Bastianelli, and others have found it only in the maternal placenta. It is certain, however, that maternal malaria reacts on the infant, who is weakly and often presents marked enlargement of the liver and spleen. Below six years of age the symptoms differ somewhat from those of the adult. First there is a cold stage, generally short and followed by a rapid rise of temperature for several hours; at the same time there is vomiting and convulsions. Often a severe diarrhœa is noticed, and when the attacks are repeated swelling of the spleen is accompanied with phrenic neuralgia, specially on the left side. The sweating is less profuse than in adults, and the attacks, which may occur at any time, are more frequent in the evening, their duration being from four to thirty-six or forty hours. In very young infants fever is generally of the quotidian type, but double tertian and triple quartan are seen. Above the age of six the febrile types resemble those of the adult. Complications are frequent. Chronic malaria becomes established as easily in the child as in the adult, and the anatomopathological lesions are similar. Diagnosis is made by blood examination, and treatment consists in large doses of quinine; below two years, ½ to 1 grm.; from two to five years, 1 grm.; between five and ten years, 1½ grm.; between ten and fifteen years, 2½ grm. For chronic malaria cacodylate of soda and arrhenal. Splenomegaly is treated by X-rays and ether spray. —British Journal of Children's Diseases.

INFANTILE PYLORIC STENOSIS.*

By Charles Herrman, M. D.

New York.

ATTENDING PEDIATRIST TO THE LEBANON HOSPITAL; CLINICAL ASSISTANT IN PEDIATRICS, VANDERBILT CLINIC.

Cases of infantile pyloric stenosis are comparatively rare, not so rare, however, but that any practitioner may not occasionally meet with such a case. It is, therefore,, important that he should be familiar with its clinical features in order that it may be recognized and the proper treatment instituted. A brief history of a case recently seen will serve to illustrate the usual course of the disease.

A. L., born on Nov. 30, 1906, after a normal labor, weight, seven and a half pounds. Father alcoholic, mother somewhat nervous. One older child of 3 years was nursed successfully for one year and is now perfectly healthy. The patient was breast-fed every 2 hours, and for the first few weeks was apparently thriving and gaining in weight. At 5 weeks it began to vomit after every vomiting, two days later it became constipated. It was then seen by a physician, who modified the feeding, prescribing 4 breast and 4 bottle feedings daily. The cow's milk seemed to disagree and was stopped. Shortly after there was a period of a few days of temporary improvement followed by a recurrence of persistent vomiting and constipation. There was then another interval of improvement followed by a third attack. During the 5 weeks since the onset of the trouble the infant had been losing steadily in weight. On Feb. 15, when 10 weeks of age the patient was seen for the first time. It then weighed 5 pounds, 12 ounces, having lost 3 pounds during the previous 5 weeks and weighing nearly 2 pounds less than at birth. It was very much emaciated and apathetic. In the epigastric region a peristaltic wave was seen moving from left to right, the contracted stomach presented the characteristic hour glass appearance (Fig. 1). A little to the right of the median line, midway between the ensiform cartilage and the navel a small tumor about the size and shape of an olive could be felt. The diagnosis of hypertrophic pyloric stenosis was made and operation advised. However, the parents would not consent. The mother was told to continue nursing every 2 hours for not more than 10 minutes at a time, to apply warm compresses to the epigastrium and to give a rectal injection every second day if the bowels did not move spontaneously. Two days later the vomiting became less frequent and the bowels began to move spontaneously every second day. From this time the patient improved slowly but steadily. Peristalsis was visible for 2 weeks after improvement began. There was occasional vomiting for 4 weeks. In the meantime the mother's condition had also improved, she was less nervous and anxious, and was able to give the baby a sufficient quantity of breast milk every 3 hours. The patient is now (Sept. 20, 1907) at nine and a half months of age, still pale and underweight. No teeth have as yet appeared. In all other respects it is normal.

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*Read before the Alumni Society of the Lebanon Hospital, Oct. 1, 1907.

In this case, I should like to call attention to the intervals of improvement which often occur spontaneously or follow a change in diet. It also illustrates very well the great difficulty in deciding whether an operation is indicated. The desperate condition of the patient seemed to justify a fatal prognosis if an operation was not performed, and still it recovered without one. In one other case (Archives of Pediatrics, 1901, page 293.) I have seen the same sudden change for the better when the child was at its worst.

At the outset it will be necessary to define the class of cases which we are considering under the term infantile pyloric stenosis. First we exclude the cases of congenital stricture of the pylorus. They are exceedingly rare, often associated with strictures in other parts of the gastro-intestinal tract and other congenital anomalies. The symptoms appear immediately after birth and the patients die within a very short time. Cases of pyloric stenosis due to pressure from without are also excluded. The remaining cases some authors divide into: 1. Cases of simple or functional pyloric spasm. 2. Cases of hydertrophic pyloric stenosis. This subdivision is an artificial one. Those cases which recover under dietetic and medicinal treatment are placed in the first group; those which do not improve in the second. It assumes that a simple pyloric spasm may give all the *characteristic symptoms.* This has never been demonstrated. All the cases *with characteristic symptoms* which have been operated on, or examined post mortem have shown some muscular hypertrophy. Those cases with characteristic symptoms which recovered without operation; and died subsequently from some other disease, have also shown a muscular hypertrophy.

Cautley, who among others makes the above division, subdivides the cases of *hypertrophic* stenosis into (1) cases with symptoms of acute obstruction, (2) typical cases, (3) mild cases. The mild cases of this group differ in no fundamental way clinically from cases of so-called simple pyloric spasm which have presented the characteristic features of pyloric obstruction and have recovered without operation. I have compared carefully the symptoms presented by patients with hypertrophic stenosis, corroborated by operation or autopsy, with the symptoms presented by those which recovered without operation, and could find no essential difference, at most there is a difference in degree or intensity. It therefore seems safer, for the present at least, to divide the cases simply into mild and severe.

A great deal has been written on the cause of this condition. The discussion is purely academic and will help us very little in deciding on the method of treatment. It is sufficient to say that the greater part of the evidence furnished by those who have examined cases during operation and post mortem, points to a congenital anomaly of the pyloric ring. It does not seem probable that the muscular hypertrophy is due to the muscular spasm. Many points speak against such an assumption.

However, the muscular hypertrophy is associated with a spasmodic muscular contraction not only of the pylorus but of the rest of the stomach as well.

The pathological change consists primarily in a marked hypertrophy of the circular muscular fibers of the pylorus. The

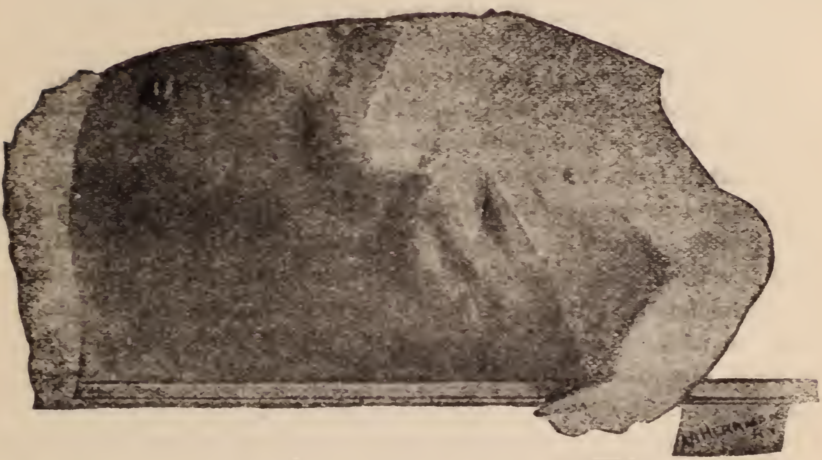

Fig. I.

Hour-glass contraction in pyloric stenosis. Drawing to illustrate Dr. Charles Herrman's article.

remaining tissue is very little affected. There is no marked new growth of connective tissue. The pylorus presents macroscopically a firm thick cylinder encircling the pyloric canal.

Symptoms. A *tumor* is palpable at some time during the course of the disease in about one-half the cases. The usual location is a little to the right of the median line midway between the ensiform cartilage and navel. It is about 1 inch long and ½ inch wide, in size and shape. Not unlike an olive. It is usually felt after the patient has become emaciated. In its normal position the pylorus is not palpable, but the dilatation of the stomach which follows pyloric obstruction together with possibly a laxity of the suspensory ligaments makes palpation possible. In those cases which recover, as the general condition improves the abdominal wall becomes thicker and the tumor can no longer be felt. Finkelstein introduces a stomach tube to the pylorus in order to verify the fact that the tumor is at the pylorus. Ibrahim has been able to feel the pyloric tumor contract under the finger, thereby proving the existence of a true muscular contraction in addition to the muscular hypertrophy.

When *peristalsis* in its characteristic form is present it may be considered pathognomonic of pyloric obstruction. This characteristic form present itself as a slow wave which passes over the stomach from left to right. Appearing at the free border of the ribs it travels across the epigastrium to disappear at or near the pylorus. Often two waves are seen following each other, with a marked constriction between. The stomach then assumes the characteristic hour-glass form. At the beginning of the disease the abdominal tissue conceals the movements of the parts beneath, but after the child has become emaciated it is invariably present. It may be made visible by giving the patient milk, by simply allowing it to suck a rubber nipple, or by kneading or flicking the abdominal wall. Visible peristalsis may persist after the vomiting has ceased, proving that a partial obstruction at the pylorus alone is not sufficient to cause persistent vomiting. In manantic infants with a dilated stomach a faint peristaltic wave may occasionally be seen passing over the stomach, but this is very different from the distinct tonic contractions which are present in pyloric stenosis.

The characteristic vomiting is expulsive, and not simply a regurgitation. It is due not to a closure of the pylorus alone but to a series of contractions of the entire stomach. It might be likened to the action of a bulb syringe in which pressure on the bulb causes a sudden expulsion of the contained fluid. The vomiting is usually the first symptom to attract attention, it follows nearly every feeding, usually within a few minutes. This vomiting is persistent, only slightly and temporarily affected by a change in the quantity or character of the food given. When the stomach is dilated and retention of stomach contents takes place the vomited matter may have a disagreeable odor due to the presence of butyric and other fatty acids.

In cases in which the pyloric obstruction is marked, the constipation is obstinate and the bowels never move spontaneously. When there is an occasional movement these are small in quantity, thick, pasty and dark in color. The amount of fœcal matter gives a very good idea of the degree of pyloric stenosis. In mild cases the bowels may move regularly but in small amount.

As very little water is absorbed from the stomach and very little passes into the intestines the urine is always diminished in amount.

In marked cases the weight progressively diminishes. This furnishes a very accurate guide as to its severity. Three or four pounds may be lost in the course of a few weeks.

As the inanition becomes more pronounced the amount of food that can be given without producing symptoms of alimentary intoxication becomes progressively smaller. It is important to bear this in mind. An effort should be made to ascertain what is the minimum amount of food necessary to prevent a loss in weight. In a few cases of pyloric stenosis in infants fed with breast milk, this has been shown to be remarkably low, as little as 14-16 ounces being sufficient for a child of 8 or 10 weeks.

The most important question and the one most difficult to decide is, shall the case be operated and if so, when? Three different views are held.

First. Those like Cautley and Stiles, who operate as soon as the diagnosis is made. Second. Those like Heubner who say do not operate, keep up the nutrition, and third, the greater number of authors who take a middle course and employ dietetic and medicinal measures, and if these are not successful, operate.

At first sight the first two views seem diametrically opposed. On closer analysis, however, it will be found that they have much in common. Cautley and Stiles consider cases which recover on dietetic treatment cases of simple spasm, they are not to be operated. On the other hand Heubner holds that if dietetic and medicinal measures are not successful the cases should be operated in the third month.

In discussing the question of treatment much confusion has arisen from a failure to separate the mild and the severe cases. In his work on the diseases of children, the preface of which is dated October, 1903, Heubner speaks of having seen 20 cases of congenital pyloric stenosis. In a paper read at the meeting of the German Pediatric Society in Sept., 1906, he speaks of having seen 49 cases, that is in 3 years, 29 additional cases or about 10 a year. It may be safely stated that many of these must have been of the mild variety such as would be grouped by the English authors as cases of simple pyloric spasm without hypertrophy, for very few authors, including many with a very large experience, have seen more than 2 or 3 cases, with typical symptoms, a year, for example, Cautley in 8 years saw 16 cases.

Bloch from Hirshsprung's clinic reports 12 cases occurring during last few years. Ibrahim's monograph is based on 7 personal cases.

During the last 6 years, although I have been constantly on the lookout, I have seen but 4 cases with the typical manifestions. Heubner's 49 cases occurred in a total of 10,000, *i.e.*, ½ of one per cent., an extremely large percentage even including mild cases. I think I am safe in saying that Cautley's 16 cases occurred in a very much larger material.

It would, therefore, be unfair and give an entirely erroneous impression of the relative value of the medical and surgical treatment, if for example, we were to compare Heubner's 21 cases treated medically with 2 deaths and Stiles' 20 cases treated surgically with 14 deaths.

In comparing the relative merits of these two methods of treatment we must consider:

1. The severity of the cases.
2. Whether operated on in private or hospital practice.
3. Whether breast or bottle fed.
4. The condition of the patient at the time of operation.
5. The technique.
6. The care and feeding after the operation.

In the past the cases which have recovered under dietetic treatment have been chiefly those of the mild form. In those which did not respond to such treatment, operation was looked upon as a last resort. Cautley and Stiles's operated cases were all such as were treated dietetically without success, they were, therefore, of the severe form.

All those who have had much experience with this class of cases agree that the results in private are better than in hospital practice. Heubner's 2 fatal cases occurred in the hospital.

Meyer recently reported 3 fatal cases treated at Finkelstein's institute. The great difference in the results in the cases treated surgically, in shown by Cautley's 9 cases. Four cases in private were operated on with no deaths. Five cases in hospital practice with 3 deaths. Other things being equal, a breast-fed infant will have a better chance to recover than one artificially fed. Complicating gastro-intestinal disturbances have a decided effect on prognosis.

Many severe cases have been operated on when the patient was in a desperate condition, and died immediately after the operation from the anæsthetic or from heart failure. In many the inanition was so marked, the tolerance for food so low that even when the operation made it possible for food to pass into the intestines this could not be properly assimilated. If operated early these cases would have had a much better chance, however.

Many deaths following operation have been the result of faulty technique. In divulsion the peritoneal coat has often been torn. In pyloroplasty the pylorus has not always been rendered patent. Avoidable accidents have also followed in several cases of gastro-enterostomy. With more experience, greater rapidity and less handling of the parts, the mortality from these operations will be considerably reduced. The care and feeding after the operation are of the greatest importance. Many patients who recover from the operation, die subsequently from some digestive trouble.

Treatment.—A history of persistent vomiting in a breast-fed infant that has been nursed at regular intervals, should lead us to suspect pyloric stenosis. If the case is seen in the first stage acute gastric indigestion will probably be the first diagnosis. However, 24 hours on a water diet will not stop the vomiting. If seen at a later stage when the child is emaciated, besides a history of persistent vomiting and constipation, gastric peristalsis may be visible, possibly a pyloric tumor felt. Assuming that the case is seen early, we begin by washing out the stomach and putting it for 24 hours on a milk free diet. On the following day if breast-fed it is nursed every 2 hours for 5 or 10 minutes. By weighing before and after feeding the amount obtained can be ascertained. Two ounces if retained every 2 hours are sufficient for an infant of 8 or 10 weeks and no more should be given. In this way only the first portion of the breast milk which contains a comparatively low percentage of fat is given. Cannon has shown that of all the food elements the fats are last to leave the stomach. In special instances it may be an advantage to feed by gavage. Sucking in itself, may excite increased gastric peristalsis. If breast milk cannot be obtained a weak milk mixture, low in fat, should be tried. Condensed milk is a convenient form. Whey or buttermilk also meets the requirements.

When there are symptoms of retention and stagnation of stomach contents as shown by the disagreeable odor of the vomited material, or when there is much mucus, stomach washing will act favorably. According to Pfaundler it also causes a relaxation of the stomach wall. Hot compresses may be applied to the epigastrium, for 2 hours at a time, changing the compress every half hour.

As very little water enters the intestine from the stomach it must be supplied in other ways. The rectum absorbs water very readily. A cleansing enema is followed by an injection of a few ounces of normal saline solution, and the buttocks held together for 15 or 20 minutes.

Nutrient enemata are very unsatisfactory, very little nourishment can be given in this way, and the rectum soon becomes irritated so that nothing is retained. Drugs are of very little value. The patient is treated in this way, noting each day the frequency and the amount vomited, the number and quantity of the stools, approximately the amount urinated, the temperature, the condition of the nervous system and especially the weight. If after a week or ten days of dietetic treatment the child has lost a pound or more operation should be advised. It is, of course, possible that such a case might recover without operation. However, we have no means of judging this in advance. The chances of recovery after operation, at such an early stage are decidedly better.

Whether pyloroplasty or gastro enterostomy rests with the surgeon. He will naturally choose the operation with which he has had the most experience, in which he is therefore the most expert. The technique of the operation it is not within the scope of this paper to discuss. It is very fully described in a recent article by Stiles.

The after treatment is exceedingly important, careful nursing is essential. The feeding is outlined by Cautley as follows. During the first two days one ounce each of peptonized milk and water are given every 4 hours by rectum, the next two days every

6 hours, the following two days every 12 hours. For the first 6 or 12 hours a teaspoonful of hot water is given by mouth every 15 minutes, then the same amount of whey. Later breast milk is given. If this cannot be obtained, beginning with a very weak milk mixture, this is gradually increased in amount and strength until the patient is on a normal diet. A number of patients operated on 7 or 8 years ago, have remained in perfect health since that time.

250 West Eighty-Eighth Street.

Lactone in Infant Feeding.—CHRISTISON (St. Paul Med. Journ.) advocates the use of lactone tablets. This represents pure lactic acid bacilli in sugar of milk compressed into tablet form. They are a perishable product, and since they contain live micro-organisms, are subject to the same influences which appertain to the keeping of cultures generally. It is stated that they should be used within three months from the time of their manufacture.

The usual directions given were to add to one quart of milk 4 per cent. to 5 per cent. fat, the fresher the better, one-third that amount of water, a pinch of salt, then crumble one of the tablets into the vessel, and stand in ordinary room temperature till soured, usually from twenty to thirty hours. This is then thoroughly stirred with a spoon and placed on ice till ready for use. It can now be modified in any degree required by the addition of barley water, oatmeal water, rice water, or any diluent the physician may wish to use; in my case barley water and arrow-root water were employed for the most part, and cane sugar in varying proportions added to sweeten the food.

He used this in all in 108 cases, varying from simple indigestion to atrophy, the ages ranging from eight weeks to nine months. These have been under observation for from ten days to two weeks in the cases of simple indigestion, to from three to five months in the more severe types.—Medical Standard.

THE ETIOLOGY AND PATHOLOGY OF ACUTE DYSENTERY.*

By William B. Meister, M. D.

ATTENDING PHYSICIAN AT POLHEMUS HOSPITAL O. P. D. AND THE JEWISH HOSPITAL O. P. D.

The word dysentery, compounded from the Greek, Dus, meaning bad, and entera, intestines, if translated literally, includes a list of enteric ailments almost as long as the intestines themselves. Modern science, with due reverence for things ancient, retains the name, but imposes upon us a definition limiting its application as follows:

Dysentery is a disease of the ileum, colon and rectum, characterized pathologically by catarrhal and diphtheritic inflammation and necrotic ulceration of the intestinal mucous membrane,—clinically, by bloody diarrhœa, griping and tenesmus. Explicit as the foregoing may seem, it demands further qualification,—the qualification which is born of a knowledge of the etiology of the disease it describes. As a result we recognize two distinct etiological types, the bacillary, and the amœbic. The amœbic form, because of its comparatively infrequent occurrence in our country, interests us perhaps less than the bacillary, whose efficiency as a depopulator is ably attested by a million graves in every country and in every climate.

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*Read before the Pediatric Section of the Kings Co. Medical Society, Sept. 27, 1907.

Century after century, dysentery reaped its enormous harvest of death, baffling the best efforts of those who sought to fight it by discovering its cause. In 1875, Losche, of St. Petersburg, first demonstrated the presence of amœbæ in dysentery. Koch, in Egypt, and Osler, in America, confirmed his findings later; yet in spite of the most earnest endeavor, only the tropical or endemic form of dysentery could be accounted for by the amœba. The epidemic form seemed as much a mystery as ever. From 1888 to 1898, the bacillus coli communis was studied with avidity and almost accepted as the cause of epidemic dysentery.

In 1898, Shiga, in Japan, found a bacillus in the stool of a dysenteric patient, which showed agglutination with the latter's serum. From that time to the present, investigations the world over have confirmed the findings of Shiga, beyond all doubt. Flexner, Musgrave and Strong, in the Philippines; Kruse, in Germany; Drigalski at Doberitz; Spronck in Holland; Vedder and Duval, in the Eastern United States; Muller in Austria; Rosenthal in Moscow; Dopter in France; Jurgens in Prussia; Deycke in Constantinople; Castellani in Ceylon;—all these, in widely separated countries, with native epidemics to study, found and confirmed the bacillus. Duval and Bassett, and Knox and Woolstein demonstrated the bacillus in summer diarrhœa in infants. Flexner and Holt, in 1903, showed that the dysentery bacillus can cause infantile diarrhœa, both winter and summer.

The bacilli themselves are described by Shiga, as small plump rods with rounded ends, very similar to colon bacilli, usually single, but occasionally occurring in pairs. They are non-motile and no flagella can be demonstrated. There is no spore formation. They stain readily with the ordinary aniline dyes, but are decolorized by Gram's method. The cultural characteristics are as follows:

I. In Gelatin, deep colonies are round or oval, with sharp borders. Surface colonies are often leaflike in appearance, resembling those of typhoid bacilli.

II. In Agar, they show less growth than the colon bacillus. After 24 hours' incubation, small, thin colonies, which are round and appear moist when viewed obliquely, are formed. After several days, they become thicker, of a grayish white color, and show thread formation.

III. Glucose agar produces a grayish white growth along the entire line of inoculation, but no gas formation.

IV. Bouillion shows an even clouding with sedimentation, but after standing for a few hours the upper part becomes clearer.

V. Litmus milk gives weak acid reaction after 2 to 3 days' incubation and alkaline, after 5 to 7 days.

VI. Growth on potato depends on the reaction of the latter. If acid, the growth is not perceptible to the naked eye. If the potato is cooked in weak soda or salt solution, it is easily discernible, and is white or brownish in color.

The injection of a small quantity of the bacillus culture into the peritoneal cavity of a rabbit, causes severe catarrh and hemorrhages of the serous membrane and the walls of the bowels, with paralysis of the limbs and the death of the rabbit, in a few days. The mucous membrane showed severe œdema, hyperæmia, hemorrhages and gangrenous ulceration. The microscopical changes coincided with those found in human dysentery of accidental origin.

That the active agent is a toxin, is proven by the fact that 1-10 c. c. of a filtrate of a seven-day-old bouillion culture injected intravenously, in a rabbit, brought about the same pathological changes as the injection of the pure culture into the peritoneal cavity. Shiga clinically divides the toxin into two compound parts; one, a nerve toxin, producing paralysis of the limbs and urinary bladder, with severe hemorrhages in the cord, and another, the enteric toxin, causing the changes in the bowel. Heating at 70 F. has no effect on the action of the toxin, and 80 F. does not always destroy it entirely.

It is to be expected, in the study of a specific infection, by so many investigators, that a discordant note should be sounded; and unfortunately we have one here, which concentrated effort seems only to accentuate. That note was sounded in the study of the agglutination value of dysenteric serum, and in the investigation of the action of the bacillus dysenteriæ on carbohydrates. As a result of the former, we learn that there are many types of bacilli, each of which can be highly agglutinated only by its own blood serum. This has a most important bearing on diagnosis, when we bear in mind the great value of its analogy, the Widal test in typhoid fever. The latter has been used by Hiss as a basis for the classification of dysentery bacilli given on the chart. These types do not differ in morphology or other cultural characteristics, and one, two or three of them may be isolated from the stools of the same patient.

The mode of infection closely resembles that of typhoid. The stools of patients contain countless numbers of the bacilli. Proper care in handling and destroying dejecta ought to limit any epidemic promptly. As in typhoid, water is the most efficient bearer of infection and causes contamination of bathing pools, drinking wells, milk-containing vessels, and every food stuff, in the preparation of which water is essential. The fly and other insects unconsciously act as carriers of infection from dejecta to food preparations. With the bowel evacuations as the initial source of infection, it is but natural that dysentery should prevail among peoples whose surroundings are unsanitary. Therefore it invariably accompanies war. In the Japanese-Chinese war of 1894-1895, the ratio of dysentery patients to wounded was as three and a half to one.

Although more frequent in summer and in children under two years of age, dysentery may occur in all seasons and at any age. In this country, at any rate, children are the greatest sufferers. Dysentery is most often primary, but measles, diphtheria, and bronchopneumonia are frequently followed by a fatal dysentery. In institutions, poorly nourished children, marasmics and those afflicted by other intestinal disorders, fall easy victims of dysentery.

The lesions of dysentery affect the lower portion of the ileum and the entire colon. They represent all the stages of inflammation, from hyperæmia to necrosis, and begin in the mucosa. The bacilli remain in the folds of the intestine, multiply, and produce toxins. The mucous membrane reacts by inflammation. Elevated portions of the mucous membrane, such as the folds and the parts most irritated by contents of the bowel, as seen at the flexures and the rectum, are most affected. The membrane becomes red and swollen from hyperæmia and œdema. The latter or catarrhal stage is followed by necrosis of the epithelial layer and the stools contain loose flakes which are groups of epithelial cells, whose nuclei appear hardly stained when viewed with the microscope. The necrosis rapidly involves the deeper parts and the entire bowel wall appears thickened. The lymph follicles in the submucosa become necrotic and purulent, and as these slough, we have the third stage or that of ulceration. The latter involves the entire mucous and submucous layers, leaving the muscular coat bare. The ulcer shows abrupt, swollen and infiltrated borders, in contradistinction to that of amœbic dysentery, whose borders are markedly undermined. Peyer's patches are only moderately swollen or not at all. The solitary follicles may be swollen and hemorrhagic. The peritoneum is also inflamed and as a result adhesions often exist. In severe cases ecchimoses exist. The mesenteric lymph nodes are found swollen to correspond with the location of the lesions in the intestines. The kidneys frequently show hyperæmia and cloudy swelling as in other acute toxæmias. The spleen and liver seem to be unaffected. That the bacillus does not enter the circulation, seems to be borne out by the absence of distal lesions such as roseola, pneumonia, osteomyelitis, and so-called infectious spleen. Rosenthal mentioned a case of apparent septicæmia, in which he found the dysentery bacillus in the heart, blood, spleen and mesenteric glands, nine hours after death. His case seems to be the exception which proves the rule.

Numerous bacteria are found in the enflamed mucous membrane, especially the necrotic portion, but the bacilli predominate. The bacilli are especially numerous in the glands, in the gland cells, and in the glandular stroma. The evacuated stools contain the bacilli in great numbers, and they may be demonstrated early, if the lesions are low down. Interesting, from a prophylactic standpoint, is the fact that the bacilli may be found in the stools, in considerable numbers, 20-30 days after convalescence.

SARCOMA OF THE TESTICLE.

By Henry Roth, M. D.

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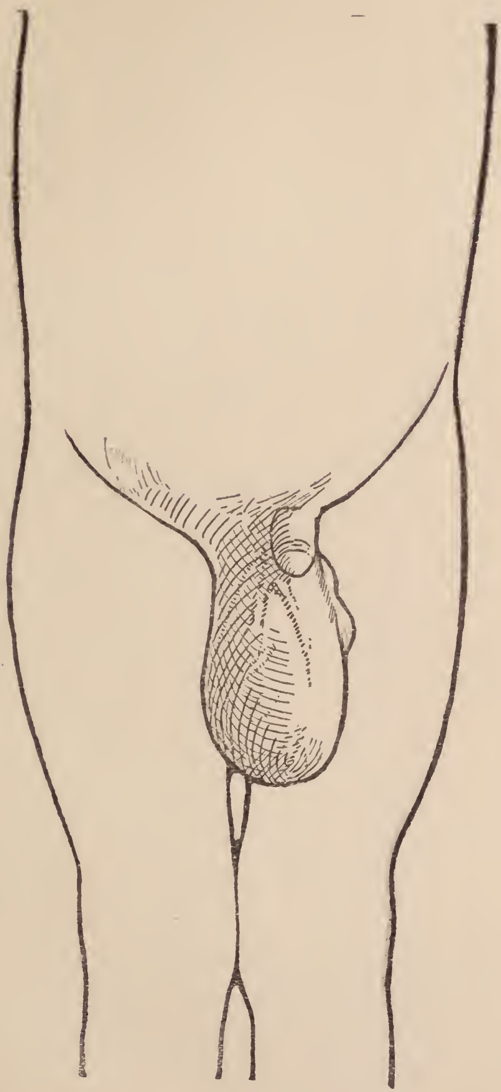
Tumors of the testicle are comparatively rare. The most satisfactory classification of these tumors is based upon their origin and according to Kaufmann (Spec. Path. Anat. 1901.) we may have connective tissue tumors, epithelial tumors and mixed tumors. From a clinical standpoint tumors of the testicle may be divided into benign and malignant and often the latter are more common, especially sarcoma, which occurs not infrequently in infants and children under ten years of age.

The following history of a young child with sarcoma of the right testicle will serve to illustrate the forthcoming remarks:

Edward K., 5 years old, a native of the United States, was admitted to Lebanon Hospital on June 19, 1906. His family history was negative and the only illness which he had was measles. Three weeks before admission to the hospital his mother observed a swelling of the scrotum which according to her statement, was neither painful nor tender to the touch. The boy claimed to have fallen several days before the swelling first appeared, but made no complaint of it at the time and the tumor was only discovered by the mother during a bath. The swelling increased gradually and when examined at the hospital it was ovoid in shape and reached down to the middle of his thighs. (See photograph). It was hard to the touch, smooth, and in the posterior portion several nodules could be felt. The right testicle could not be identified, the tumor apparently taking its place. The left testicle was found to be normal and was on the left side of the tumor in its uppermost portion. The scrotum was freely movable over the mass and presented many enlarged veins on its surface. The tumor was not translucent nor tender. The spermatic cord was not perceptibly enlarged nor was there any involvement of the inguinal glands. The patient's general condition was very good; heart and lungs were normal. There was no anæmia or cachexia and a physical examination of the abdomen revealed nothing abnormal. Temperature and pulse rate were normal. With a tentative diagnosis of sarcoma of the right testicle the patient was operated upon by the writer on June 20, 1906. Under ether anæsthesia the tumor was removed without any difficulty, the spermatic cord being divided at a high level. The wound healed by first intention and the patient was discharged well on July 6, 1906. On examination the tumor is somewhat kidney-shaped, 10.5 cm. long, 7.5 cm. broad and 5 cm. thick. Its surface is smooth. On cross section a cavity is formed within the mass which contains a small amount of bloody fluid. The landmarks of the testicle and epididymis can not be identified. Microscopical examination of several sections shows the tumor to be sarcoma of the endothelial variety. The patient was examined by the writer on Oct. 10, 1906, and found in very good condition. On Jan. 28, 1907, he was seen again by the writer and at this time very extensive involvement of the retro-peritoneal glands was found, the abdomen being filled with very large nodular tumors. The right side of the abdomen was almost entirely filled with a large nodular and very tender tumor. There was no local recurrence in the scrotum. The patient had lost considerable weight and was decidedly cachectic. From this time on he failed very rapidly and died on Feb. 26, 1907, with evidences of metastatic involvement of the brain and lungs.

Sarcoma originates usually in the posterior portion of the testicle but may start in the epididymis. It appears as a small nodule which in its growth crowds the testicle towards the periphery. In large tumors only a thin shell may be demon-



Drawing from a photograph of Edward K. to illustrate Dr. Roth's article.

strated as the remainder of the organ. An effusion may occur into the tunica vaginalis which may be serous or bloody. As the tunica albuginea and the tunica vaginalis are gradually invaded the mass breaks through the scrotum and a condition develops which has long been known as "fungus testis malignus." The neoplasm may be hard or soft and on cross section is white, yellow or grayish red and at times multiple cysts may be seen. Metastasis occurs through the blood vessels and secondary growths may be found in the lungs, liver, brain, retro-peritoneal lymph glands, the other testicle, the skin and bones.

There is frequently a history of traumatism as an etiological factor. The disease begins insidiously as a small nodule or thickening in the testicle which may remain quiescent for several years and then suddenly take on rapid growth attaining considerable size. In children it grows very rapidly. The tumor for a long time is painless and is usually ovoid in shape. It is as a rule hard and smooth but occasionally is nodular. The skin at first is freely movable and unchanged, but if the tumor is not removed early it is invaded by the growth and then breaks, giving rise to a fungous mass. If an effusion develops in the tunica vaginalis, some parts of the tumor will feel softer and more elastic. Frequently the spermatic cord is involved and becomes thickened. Glandular involvement of the inguinal region is rare but involvement of the lumbar lymph glands is early. The retro-peritoneal glands may form enormous intraabdominal growths which are very painful. The general condition of the patient remains good as long as metastases are absent. The appearance of the patient in the early stages is not changed and anæmia, loss of weight and cachexia are only seen where the disease is generalized. When metastatic growth develops in the retro-peritoneal glands, the lungs, brain, liver, skin or bones, the general condition grows rapidly worse and death is not far off.

In the early stages of the disease a positive diagnosis may be very difficult, but not so in the more advanced stages. A neoplasm of the testicle in a young child is more likely a sarcoma than a carcinoma, which latter occurs in older patients, usually in men beyond forty years of age. A carcinoma grows more rapidly and is more nodular and the inguinal lymph glands are involved at an early stage. In tuberculosis, which is rare in young children, the swelling breaks down and the resulting fistulæ discharge cheesy material. A hydrocele forms a painless, slowly growing tumor with fluctuation and translucency. The testicle and epididymis can readily be distinguished and glandular involvement is absent. If the hydrocele is old, with thick walls, diagnosis may present some difficulties. A hematocele is usually of traumatic origin and is a growth of a few hours, whereas sarcoma is a growth of much longer duration. There is usually considerable pain in the very beginning, while in sarcoma the growth is painless for a long time.

Prognosis is extremely bad, especially in children. Lasting results are of extreme rarity and recurrence may be local but is usually in distant parts of the body. Most of the patients die in a short time, even after castration is performed. Where the recurrence is local at the site of the original tumor, the prognosis is somewhat better.

Early removal of the affected testicle is the only treatment which affords relief but does not necessarily prevent metastatic growths. In the operation, which is not dangerous, the cord should be divided at the highest point possible. When distant metastasis is absent local recurrence should be removed. Operation for the removal of metastatic growths seems to be of little value and should be refrained from.

The Microbe of Poliomyelitis.—WETHLOFF (Norsk. Mag. for laegevidenskaben, No. 3, 1906). With reference to the publications of Geirsvold concerning microbes found in poliomyelitis, the author points out that he, as far back as 1901, obtained a micrococcus in pure culture from the cerebrospinal fluid of a patient having poliomyelitis, this organism closely resembling that found by Geirsvold and Lie. He describes the manifold transitions between individual micro-organisms, according to the kind of culture, and expresses the opinion that the agents of poliomyelitis must be more closely related to the staphylococcus than the streptococcus, being most directly akin to the micrococcus tetragenus of Gaffky.—Medical Review of Reviews, Aug., 1907.

A PLEA FOR A MORE CAREFUL STUDY OF THE INDIVIDUALITY AND DEFECTS OF CHILDREN.*

By John J. Moore.

Socrates once said, "Could I climb to the highest place in Athens I would lift my voice and proclaim: 'Fellow Citizens, why do ye turn and scrape every stone to gather wealth and take so little care of your children to whom some day you must relinquish it all?' " There is no department in medicine more significant or should receive more careful attention than the physical condition of our children. The economic medical questions that are being discussed by the physicians to-day, are just as much of vital interest and importance to mankind, as a scientific discussion on disease. We are living in a progressive age. Many new and great things are being discovered in all branches of scientific research and commercial enterprise. The medical profession is alert with the spirit of the times and is fast approaching a higher plane of work than that of drug prescribing. It is through the unselfish efforts of the physician that much good has been accomplished along the line of preventive medicine. The splendid work that is being done by our local and State boards of health in preventing the spread of contagious disease; the laboratories that are being devoted to the special work of ferreting out the cause of malignant disease; the most encouraging reports of the modern treatment of tuberculosis; the marvelous results of modern surgery; the most hopeful field just being developed in serum therapy; the marked improvement in public hygiene, are all due to zealous efforts of the medical profession. It is impossible for even a master mind to cover the entire field in the advancement of medical science, but the division into its special branches is helping to pry deeper into nature's secrets, which is greatly benefitting suffering humanity.

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*Read before the Fifteenth Annual Meeting of the Ohio State Pediatrics Society, Wednesday, Aug. 28, 1907, at Cedar Point.

Biologists are searching for the spark of life and much progress has been made in cytology. Physiologists are giving us a better insight into the physical function of the body. Pathologists are able to trace the normal cell through its cycle of degenerative changes, and in many cases point out the specific cause of disease. Clinicians have formed many rules to aid us in making a correct diagnosis which helps us in treatment of disease. And yet with all of this vast improvement in our profession, we are not giving the proper attention to our children upon whose shoulders the future progress and burdens of the world must rest. It has been said, "All men are born equal," but all men are not endowed with the same amount of physical and mental force. To use a commercial phrase, some children are born with an excess of physical assets while others come into the world on the verge of physical bankruptcy.

Cytogenesis and cytolysis differ in all persons and an attempt to compare one individual with another in health or disease is erroneous. Every child is a law unto itself, and the study of the individual characteristics of children is perhaps much neglected. No set of rules, no matter how scientifically worked out, will apply in all or even a majority of cases. However, we must have a working basis and apply fundamental principles in the study of child life.

Much has been said about infant feeding, which seems to be responsible for the high mortality in infancy when an artificial diet must be used. We should always insist upon maternal feeding (nature's food for the infant), and when from some good cause this can not be done modified cow's milk should be used in all cases. The proprietary foods that are so numerous in the markets should rarely if ever be used. The ingenious methods worked out in per cent. feeding of infants have helped to solve the problem in the use of cow's milk. Hubner has suggested that the food constituents be measured in heat units (calories.) One gram each of proteid and sugar equal 4.1 calories and one gram of fat 9.3 calories. If the number of calories taken in twenty-four hours are divided by the kilogram of body weight, this will give what Hubner calls "Energy Quotient" or the number of calories given to each 1,000 grams of the infant's weight. We know that the proteids are the tissue builders and the carbohydrates and fats the heat producers and that it requires about seventy calories per kilogram to maintain the body weight. This theory used in connection with per cent. feeding enables us more readily to adjust the food to the digestion of each child under all conditions.

However, we should study more carefully the individuality of children and try to simplify the methods of raising them. I fear we are injecting so much technic in the care of infants, that it becomes a burden to the mother, and causes a dislike for maternity. The best results may be obtained by a careful inspection of the infant by the family physician at stated intervals during the entire nursing period. Yea, even more, the physician should be in touch with the child from birth to adolescence. With a systematic inspection of all children we would become better acquainted with the physical imperfections of each child which would enable us to render better service than to see the child only when sick. I believe that much sickness could thus be avoided and infant mortality greatly reduced. No man will transact any important business without consulting an attorney. Are not his children of greater importance than any of his worldly possessions? Is it not his imperative duty to give them the best possible chance to make strong men and women, that they may be better able to cope with the difficulties in life they are bound to encounter? This can only be done by the careful study of each child, by strengthening the weaker organs and correcting any anomaly that may exist. You may say this is impracticable on account of the large per cent. of indigent persons who are not able to pay for a physician's services. Not so. The man who possesses the riches of the world has a moral right to care for the children of his more unfortunate brother. If by the blessing of God one man has been favored more than another he should be willing to pay the ransom for that favor.

Aside from the moral aspect it has an economic side which is of interest to the State. A report from the juvenile courts of New York and Chicago shows that eighty-five per cent. of the culprits have some mental or physical defect. A statistical report of the school children that have been examined in the cities shows sixty-five per cent. with physical defects of greater or less degree and ninety-five per cent. of the laggards have some abnormality. A large number of these children can be restored to health if properly cared for, and a much larger per cent. materially benefitted, but if neglected they are likely to become physical and mental wrecks. Dr. Charles M. Bushnell, in a report, says that "this country is spending annually for the maintenance of paupers, criminals and vicious classes the enormous sum of six billion dollars." Dr. Bushnell finds the average factory hand earns four hundred and forty dollars ($440.00) a year, whereas the average criminal costs twelve hundred ($1,200.00) a year. It is not, therefore, evident that every person that is made self-supporting and every child that is turned from a criminal course is worth at least four hundred dollars ($400) a year to the commonwealth? The mortality tables of our country show about ninety per cent. die from disease. Is it not fair to suppose that a large number of deaths each year, due to disease have the seed sown in childhood from some neglected physical condition? If the reports from the examination of the school children and juvenile courts are true (and I have no doubt they are), we are not doing our duty unless we urge the inspection of all children and more especially those in school.

Every school should be under the care of a medical director. The children should be inspected weekly and examined monthly. In a weekly visit to the school room the physician will note some of the following conditions: The pale, improperly nourished appearance of the anæmic child; the hollow-eyed, flat-chested and emaciated tuberculosis child; others with pale lips and breathlessness on climbing stairs suggesting heart disease; the typical expression of the mouth breather, denoting adenoids; the many with tense brows, blinking lids, means nearsightedness, eye strain, headaches, etc., the constant moving of the choreacic; we also find many nasal obstructions; enlarged tonsils, scabies and often vermin; deformed spine, limbs, feet and many other conditions which curb the natural development of the child.

Besides the physical defects of the children we often find unsanitary conditions both in and out of the school room. The average teacher knows but little about hygiene, even superintendents are deficient or neglectful of school sanitation. Boards of education spend much time on curriculum, while the sanitary conditions are neglected. Not that they do not care for this department, but they are ignorant of the evil effects of unsanitary surroundings on the children. A child with a highly trained mind can not stand the trials of life without a good constitution, any more than a mansion can stand the vicissitudes of the weather without a good foundation. Furthermore we are guilty of criminal neglect if we do not give our children the best possible chance to become strong men and women.

If we are the guardians of public health we should have a voice in all matters pertaining to public sanitation and physical development of the children. France has taken a most forward step in the scientific study of child life. In Paris they have established a laboratory in connection with their schools to study the physical and mental value of each child. The principle sought for in the beginning was to establish an average of physical and mental development of children of all ages. They have made such advancement that Professor Binet who is at the head of this department, says, "Whenever a fresh subject arrives at our laboratory, we are able to prescribe definitely as to its physical and mental capacity and the needs of the child." An example for us all to follow.

The proper development of children is often a question of proper nourishment. Dr. S. A. Knopf of New York City, has gone so far as to advise serving lunches of suitable food to the impoverished school children. Such radical innovations that are advocated can not be made in a short time, but we must be constantly and persistently at work on the subject of "Child Study."

The physican, the educator, the lawyer and the minister all have a responsibility in the future welfare of the children of our country. One of the greatest evils that is facing us to-day is the influx of the undesirable element of foreign countries. This contamination if continued is bound to cause degeneracy and affect the morals of the coming generations.

The much talked of subject of race suicide in the country, is not half so much of a bugaboo as the neglected physical condition of the children. Go into the tenement districts of our cities, or the poorer homes in the country and you will find plenty of children.

There is a day of reckoning coming, a time when assimilation must take place. Can we not make it better for our posterity by building up the physical, mental and moral status of *all* children?

In conclusion, with a well organized medical profession working in harmony, we can accomplish more for the perpetuity of this grand and glorious country of ours by the proper attention given to child study than any other economic question before us to-day.

So. Charleston, Ohio.

Recovery from Exophthalmic Goiter After the Use of Antithyroidin.—M. L. Abelmann (Russki Vratsch, Sept., 1906) of the Elizabeth Children's Hospital of St. Petersburg, after giving a short résumé of the work done by others with Moebius' serum, of antithyroidin, in the treatment of exophthalmic goiter, reports the history of a striking case which came under his own observation. The patient was a girl only thirteen years old—a very young patient to suffer from this disease. The father had exophthalmic goiter and died at a comparatively early age. The child was of medium size and weight; the skin was clear, although she was somewhat anemic. Syphilis and tuberculosis were denied in the family history. The symptoms of Basedow's disease were all characteristic: exopthalmos, Stellwag's sign, von Graefe's sign, and Moebius' sign. There was a marked thyroid tumor, being 9 Cm. across. The pulse frequently was raised from 130 to 150. The patient was placed upon antithyroidin, with beginning doses of 2 drops, t.i.d., gradually increasing until 12 drops were given three times daily. At the end of three weeks the clinical picture had markedly altered. The patient became much quieter, the tachycardia disappearing completely. The exophthalmos diminished, so that the bulging of the eyelids was scarcely perceptible. The goiter had also disappeared. Stellwag's and Moebius' sign had also disappeared; von Graefe's sign persisted somewhat. The patient recovered completely.—Canadian Journal of Medicine and Surgery.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON PEDIATRICS.

Stated Meeting, Held October 10, 1907.

DR. GODFREY R. PISEK, Chairman.

Dr. Louis Fisher said that for many years he had been especially interested in the Diagnosis of Tuberculosis, and more so now because of the extensive work conducted abroad, particularly in Vienna and Berlin. The large doses of tuberculin injected in the diagnosis of tuberculosis, as brought out by Koch years ago, caused it to fall into disrepute. In this new method old tuberculin was taken and diluted with normal salt solution, 1-4. An ordinary scarifier was then used and three separate portions of an arm were scarified. On two of these the diluted tuberculin was used, the third portion was used as a control. After 26 hours there should occur a marked reaction in tuberculous cases. In the last stages of miliary tuberculosis and tuberculous meningitis there was no reaction, and this was a fact that corresponded with what Koch found when he used the pure tuberculin. The area of inflammation about the point of injection of the diluted tuberculin was about 10 millimeters in width; if more than that it should be excluded as a diagnostic aid. No infections followed these injections except in a few cases of conjunctivitis; occasionally there was encountered a severe form of rhinitis. The method was a very simple one and was an additional aid in the diagnosis of tuberculosis.

Dr. Herman C. Frauenthal presented a child with inguinal and umbilical herniæ following a severe attack of whooping cough. He was treating this patient with high frequency currents and both the doctor and the mother thought the results were remarkable. This child would be reported on at some future meeting.

Dr. Walter B. Jennings presented a typical case of Acute Anterior Poliomyelitis.

Dr. Fred. Lange Ziegel reported a Fatal Case of Hemophilia Neonatorum. The new-born infant had tongue-tie and a phimosis. Since the frenum extended to the tip of the bridled tongue, the organ could not be protruded beyond the same, and failure of suction rendered satisfactory nursing impossible. The lips of the prepuce being adherent to each other and to the glans, the meatus urinarius was invisible. To enable the patient to urinate he retracted the prepuce over the glans, exposing the meatus and causing a slight laceration on the anterior surface of the glans. To check this oozing a strip of gauze was packed under the prepucial tissue. It was then decided to correct the lingual deformity at the same time and the usual operation was performed. Six hours later he was hurriedly sent for because of continued oozing from the glans penis and because of hemorrhage from the mouth which had appeared after nursing. The bleeding from the glans was readily controlled. Oozing was steady from the cut surfaces of the frenum linguæ, yet no bleeding vessel was detected. Various hemostatic agents were used with but little effect upon the bleeding. After the application of ice and digital pressure for an hour, the bleeding was apparently controlled and he again departed. Twelve hours after the operation buccal hemorrhage was again reported. The bleeding was now more profuse than during the afternoon and after spending two hours in ineffectual attempts to stop it, Dr. Chas. A. Elsberg was summoned. Then the various measures were again used, and no better success followed. The patient was then admitted to Dr. Lilienthal's service at Mount Sinai Hospital. The blood escaped in a steady flow from the substance of the tissue as a capillary oozing. Despite the untiring efforts of Dr. Elsberg and assistants which continued till morning, the infant became exsanguinated and died seven hours after admission. No autopsy was granted. The bleeding from the mouth did not occur till some hours after the frenum was cut.

Dr. J. F. Terriberry gave Some Observations on the Recent Epidemic of Acute Poliomyelitis in New York City. He said that since the beginning of July last there had been in this city and vicinity an epidemic of infantile paralysis which in extent and severity exceeded the disease as previously seen. He was impressed with the fact that most epidemics originated in low lying regions, as well illustrated in the epidemic that occurred in Rutland, Vt. The same feature was noted in the earlier epidemics in Sweden, and along the coast of Italy. Another feature was that the epidemics occurred when the rain fall was low. Few cases coming to the hospitals were properly diagnosed. So far the bacteriological findings had been negative. It seemed difficult to get any data on this disease.

Dr. Simon Flexner said he had had an opportunity to see a number of these cases, and hoped to be able to make a bacteriological and pathological study of them. Thus far he could not report any findings of value. He appealed to those present to aid the Rockefeller Institute in the study of this disease by helping them obtain whenever possible cerebrospinal fluid, as well as fresh material at autopsies.

Dr. Henry W. Berg was struck by the inadequate methods employed for keeping records of non-fatal diseases in this city when an epidemic appeared. There should be, in his opinion, some method by which an epidemic like poliomyelitis, which did more than kill, it maimed, could be recorded. So far in this epidemic he had seen 25 cases in the practices of 14 physicians. He referred to the peculiar flaccidity of the muscles which occurred and which was very characteristic when seen early. The diagnosis rested upon that sign and the severe paralyses and loss of patella reflex. There was no Kernig's reaction at all. There was also flaccidity of the neck muscles. Dr. Berg then reported some interesting cases.

Dr. L. Emmett Holt recalled the case of a child admitted to the hospital on the fourth or fifth day of the disease with paralysis of all four extremities, and paralysis of the muscles of respiration except the diaphragm. There was complete loss of voice and a moderate amount of temperature. The child could not hold his head up. There were no cerebral symptoms. At present the child was regaining power in the extremities, but there was as yet no phonation. The respirations continued diaphragmatic. He also reported two instances, occurring in the same family, which were absolutely proven to have been directly fatal. Besides these severe cases there were cases of extreme mildness, complete recovery taking place at the end of one month or six weeks. He was struck with the utter hopelessness of the disease; at present there was nothing that could be done to limit the extent of the inflammation. The results depended not upon the treatment but upon how severe the infection was and the height of the temperature.

Dr. Henry Dwight Chapin said that this epidemic was a particularly severe one and quite widespread. He called attention to the great extent of paralysis and in many cases the neck muscles were involved. He recalled one case with respiratory phenomena. Another case had paralysis of all four extremities and of the neck muscles as well. When he was called to Poughkeepsie in 1900 to help clear up the diagnosis in an epidemic, there were about 60 cases in which pain was the marked feature and it was very uncertain whether they were dealing with a peripheral neuritis or a poliomyelitis. One child died and the autopsy revealed the typical lesions of poliomyelitis.

Dr. Joseph Collins said that there had appeared at the Post-Graduate hospital 35 or 36 cases, and it was astonishing how frequently the disease was met with at present. The cases came from all over. This epidemic he thought to be a comparatively mild one. In anterior poliomyelitis, whether inflammatory or toxic, the gray matter might be involved as high up as the pons. In three instances it was very suggestive that he was dealing with a communicable disease. Every case should be immobilized by some apparatus, and then an ice-bag should be placed along the spine from top to bottom and kept there. This may aid in checking the inflammatory reaction.

Dr. Godfrey R. Pisek had seen 12 cases in private practice and several more in hospital work. In eight cases there was a previous history of gastro-intestinal infection and he believed that in a great majority of the cases the bacterial flora were at the basis of the disease. In six of the cases lumbar puncture was done with negative results. The urinary examinations were also negative. He thought that they should pay more attention to the examination of the feces.

Dr. Josephine Hemenway said that there had been fifty cases of poliomyelitis at the Babies' Hospital during the past five years. The cases seen this year had all been severe, involving three or four extremities, and many cases had neck involvement as well. All had a sudden onset, and she thought that all recovered rapidly. A number of the cases had been diagnosed as cerebrospinal meningitis. Gastro-intestinal symptoms were present in only five cases.

Dr. T. Halsted Myers reported a case in which the diagnosis at first was in doubt. Lumbar puncture gave negative results. There was paralysis of one arm. Within thirty-six hours the paralysis entirely cleared up and in forty-eight hours the coma had entirely disappeared and the child was practically well.

Dr. Charles G. Kerley had seen 33 cases, 13 of which were included in Dr. Hemenway's report. He thought that within the first twenty-four or thirty-six hours the diagnosis of cerebrospinal meningitis was quite reasonable. He emphasized the mental apathy, the comatose condition of the patients from which it was almost impossible to rouse them. One case he saw was unconscious for four days. He believed the cause of the disease was an infection of some sort.

Dr. Henry Heiman said that of the 36 cases he had seen, 23 were males and 13 females. The onset was sudden in 30, gradual in six. Rigidity of the neck was present in four of the 11 hospital cases. Lumbar puncture was done in four of the 11 hospital cases, and pressure was found to be somewhat increased. The blood count showed a leucocytosis, which belonged to the category of infectious diseases. Aspirin was given these patients believing this disease to be an infectious one. The feet were put up in a state of flexion and inversion to prevent the resulting drop-foot, according to the advice of Gibney and Whitman.

Dr. Carlton Wallace said that at the Hospital for Ruptured and Crippled there had been about 300 cases during the last few months of anterior poliomyelitis. Month by month the cases had increased in number. There were 169 males and 131 females. During the first year there were 24 cases; second year, 80; third year, 77; fourth year, 57; from fifth to eighth year, 41; from eighth to the twelfth year, 17; after the twelfth year, 4; a total of 300 cases. The orthopedist usually treated these cases after the damage had been done. A large number of these cases would be left with paralysis of certain groups of muscles and contractures would follow. Rest should be demanded during the first three or four weeks; preventing the contractures. This was usuall accomplished by the use of Plaster of Paris. Afterwards some form of stimulation was employed, electricity, massage, etc., with encouragement to the child to use the muscles. He believed the disease to be an infectious one.

Dr. Henry W. Frauenthal showed three photographs to illustrate the facial paralyses which occurred in these cases of infantile paralysis.

Dr. Herman Schwarz said there were three distinct types of the disease, one, the ordinary type; second, the type that entirely got well; third, the one that did not come to paralysis. As an example of the first type he reported a case where, before death, the paralysis of the left lower extremity had disappeared, showing the rapidity with which function might be regained. At autopsy hemorrhages were found in the anterior horns and in the pia mater. As an example of the second type, he reported the case of a child, two years of age, with a temperature of 102. On the next day there was paralysis of all the extremities and muscles of the neck. One month later he was completely cured. An example of the third type had rigidity of the neck, temperature, etc., and it appeared to all that he was going to become paralyzed.

Dr. Sidney V. Haas gave some statistics from Dr. Holt's clinic. There were 40 cases, 15 males and 25 females, all between the ages of six months and four years. In 31 the onset was sudden. He gave figures to show the frequency of occurrence of symptoms.

Dr. L. E. La Fetra said that a man was justified in being in doubt as regards his diagnosis in many cases because frequently the symptoms were irritative and not paralytic. The condition from which poliomyelitis must be diagnosed in many cases was cerebrospinal meningitis. Many cases had gastro-intestinal symptoms preceding the onset of the disease. Certain features in this disease made one believe that he was dealing with some toxic trouble. The spasm should be relaxed by warm baths, and some suggested that they should be given continuously. Ice-bags along the spine he believed to be of value in some cases. If the temperature was low, however, and there was much pain, a mustard paste along the spine was of value. Chloral had served him well to relax the spasmodic contractions.

Dr. William L. Stowell read the paper of the evening on Blood Pressure in Children. The carotid of man supported a column of mercury 150 to 200 millimeters high. The blood pressure depended upon the energy of the ventricular systole, the peripheral resistance, the elasticity of the arterial walls, the volume of blood, etc. Strychnine increased the heart's action, while other drugs, as adrenalin, acted chiefly upon the vessels to increase pressure with little or no increase in the number of pulsations. Rise in frequency, as a rule, meant a rise in pressure. Tension in the vessels rose and fell with atmospheric pressure. The blood pressure was low during sleep. The pressure was not increased after taking alcohol, although the pulse-rate was. Tobacco increased the blood pressure through its influence on the vaso-constrictors. Pressure below 100 millimeters was said to be pathological. Vascular tension was lower in childhood than in adult life. Dr. Stowell concluded his paper by saying that (1) blood pressure in the young was low in proportion to extreme youth; (2) its rise and fall was quickly influenced by emotions as in adults; (3) diseases of the nervous system gave high pressure; (4) acute diseases with high temperature might give either high or low pressure; (5) sclerosis of arteries was almost unknown in childhood so that the use of a syphgmomanometer for its detection was needless; (6) blood pressure readings were of interest physiologically but had little clinical value in childhood.

Dr. L. F. Bishop believed it to be worth while to recognize the mechanism of high pressure. High pressure and cerebral compression was purely compensatory, *i.e.,* the pressure on the brain. Dr. Emerson had made a hole in the top of an animal's head and screwed in a canula. At the same time an instrument was introduced into the carotid artery to measure the blood pressure. When the pressure in the cranial cavity was increased, that in the carotid was increased as well, and vice versa.

Dr. L. E. La Fetra moved that the Chair appoint a Committee to confer with a Committee already appointed by the Neurological Section in order that they might take such necessary steps in the study of the etiology of acute anterior poliomyelitis. Seconded. Carried.

Dr. Godfrey R. Pisek appointed on this Committee, Drs. L. E. La Fetra, Josephine Hemenway and Herman Schwarz.

(Adjournment.)

PEDIATRICS

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EDITORIAL

PURE, CLEAN MILK.

After many years of more or less successful effort, the fight for a pure, clean milk supply in the United States is beginning to assume definite proportions, and bids fair, in the near future to accomplish important things. Already the good work is producing results. A perusal of the printed report of Dr. Henry L. Coit, President of the American Association of Medical Milk Commissions is certainly worth the while of every medical man in the country.

This movement started as far back as 1890 (under the stimulus of the good work already performed in Belgium, France and Germany), through the efforts of Dr. Coit, in the Medical Association of New Jersey, the oldest medical organization in the United States.

At first, little or no effect was produced except to arouse the profession to the importance of the subject of pure milk. But the keeping up of the fight by Dr. Coit and others, in and out of the legislature began to tell until, by 1904, following the example of the first Commission, twenty-seven Medical Commissions had been appointed in the principal cities of the United States. A conference of these Committees was held in Atlantic City in June, 1907, and the Conference was merged into a National Association with the purpose of bringing into one compact body the Medical Milk Commissions of the United States, and of adopting uniform methods of procedure; to fix chemical and bacteriological standards; to determine the scope of Medical and Veterinary inspections, and to foster and encourage the establishment of Milk Commissions in other cities. All this, of course, not to supersede nor interfere in any way with the machinery of the Health Departments employed in large cities to look after the general milk supply.

In New York City, for instance, the daily consumption of milk is one million, six hundred thousand quarts, and the control of by far the greater part must fall upon the Department of Health. Great importance therefore is to be attached to the Health Commissioner, to the Mayor's Milk Commission, and to the Milk Commission of the New York Association for Improving the Condition of the Poor. These agencies, by ordinance, or by arousing popular demand for high grade milk can do, and have done much toward improving the general quality of the marketed milk supply.

In November last, the New York Association for improving the Condition of the Poor, acting conjointly with the Health Commissioner and with several leading physicians, called a Conference to consider the question of clean milk. Twenty leading Pediatrists of New York and other cities, eight Health officers, City and State, six Professors of Universities, and the Acting Chief of the Dairy Division of the National Department of Agriculture were invited to discuss all questions related to milk.

After mature discussion this Conference declared overwhelmingly in favor of inspection as the best means of securing a pure milk supply, and against compulsory pasteurization. They also declared in favor of Infant Milk Depots as an important means of lessening infant mortality.

The Mayor's Milk Commission (a body of five distinguished physicians appointed by the Mayor to study the milk question in all of its phases) also has reported in favor of a system of inspection, sanitary handling, and refrigeration, and in favor of infants' milk depots, and in favor of the efficient sterilization or pasteurization, only a few hours before delivery to the consumer of all milk which the Board of Health finds to be unsafe for consumption as raw milk, for the reason that "notwithstanding all safeguards, there will be found cases in which unsafe milk will be exposed for sale." The Commission also recommended that the Board of Health make frequent bacteriological examinations of all pasteurized milk and destroy such milk as contains more than 50,000 bacteria per c. c.

The position of American practitioners, Pediatrists, and Health officials at the present time on the milk question is practically as follows:

1st. That the protection of the general market supply of milk can be best accomplished by proper State and Federal legislation looking to the elimination and eradication of tuberculosis and other serious diseases in cattle, and the exclusion of all persons having infectious or contagious diseases from any connection with the production or handling of milk.

2nd. By inspection of the *sources* of milk *production, handling* and *shipping;* by careful sterilization of all milk containers; by proper cooling immediately after milking, and its maintenance until delivered to the consumer; by securing and preserving sanitary conditions in all places where milk is kept for sale; in the proper and thorough cleaning of all milk containers as soon as emptied.

3rd. By the keeping of records of inspection so complete as to furnish the proper authorities with a perfect and full representation of the exact conditions at the dairies, creameries, and at the stores where the milk is exposed for sale.

4th. That pasteurization should not be used as an established or compulsory method *instead* of inspection, because it might remove the incentive to the public to compel, and to the producer to accomplish improvement, and also because unless pasteurized milk is consumed within twenty-four hours, and is kept constantly at, or below 10 degrees Centigrade, it is less desirable than clean, raw milk, and is sometimes actually unsafe. Compulsory pasteurization also would ignore the danger of tuberculosis infection through butter and other dairy products, unless combined with proper inspection of the herds, and attention to the dairies, creameries, etc.

5th. That the establishment of infant milk depots for the preparation and distribution of modified milk should be extended as a means of providing the best possible food for infants wholly or partly deprived of natural mother's milk.

The Department of Health of the City of New York is now employing the score card record system of inspection at the dairies, creameries, and stores and is constantly improving in its systematic work in regard to the complete and constant supervision over the milk supply of the city, in its endeavor to get milk into the hands of the consumers in a pure, clean condition.

The outlook is gratifying, and Dr. Coit (whose report lies before us, and from which report copious notes have been taken for this article) is to be congratulated upon the distinct advance made in the fight for pure, clean milk. The good works of the various Milk Commissions, the Health Commissioner of New York, the Health Departments of other cities, the Association for the Improvement of the Poor, as well as the Nathan Strauss infant milk depots cannot be too highly commended.

CHARLES A. CLINTON.

ABSTRACTS

Appendicitis in Children.—A. F. HOUSE, M.D. (Cleveland Med. Journ., Oct., 1907), considers this subject important because more deaths are caused by it than any other acute abdominal lesion. He brings out the difference between appendicitis of children and adults, which differences lessen as the child grows older.

Anatomically, the appendix is comparatively larger, the coats thinner and the meso-appendix shorter than in the adult. The last characteristic makes the tip more liable to disease through lack of blood supply. The omentum is smaller and aids less in the walling off process.

The symptoms are vague and obscure. (1) Pain is as severe as in the adult, but far more uncertain in its localization. (2) Tenderness, often doubtful in the same way as pain, is valuable when elicited. (3) Rigidity usually well marked is apt to involve the whole lower abdomen. Fear alone often makes children rigid, but patience and gentleness will bring out the true muscular spasm. (4) Tumor is more often absent in the severest cases, and is often obscured by the rigidity and tenderness. The mass, when felt, may be indefinite or circumscribed. A rectal examination should always be made as the appendix or inflammatory mass can usually be felt in no other way. In excitable children chloroform is particularly useful. (5) Tympanites is valuable in conjunction with the other signs. (6) Vomiting is persistent and where it continues for 24 hours in spite of treatment, accompanied by pain and tenderness, one should be suspicious. (7) Diarrhœa is unusual, but does occur. (8) Leucocytosis. There must be at least 3,500 before evidence of pus is certain, while pus is often present without leucocytosis. In children the infection spreads more rapidly, causing an early generalized peritonitis and gangrene is more rapid. The cases are more fulminant and rapid.

He believes that every case, no matter how mild, should be operated as soon as the diagnosis is made, as it is not within the knowledge of any physician what the pathological condition present may be nor how it will terminate. No medical treatment has proven of value. One exception to the rule is diffuse septic peritonitis. He has yet to see a death caused by premature operation, while many deaths are the result of delay.

Roger H. Dennett.

Apophysitis in Growing Children.—R. Romme (La Presse Médicale, April, 1907, No. 34, p. 267) contributes an article on this subject to which attention has already been drawn by A. Hardivillier in his Thesis (Paris, 1907), and also by Prof. Lannelongue. These cases of apophysary osteitis are of undoubted practical interest. In any child who complains of his heel, or knee, or spine, the last thing to be thought of would be apophysitis, if attention were not especially drawn to this point, and from the point of view of treatment an exact diagnosis is important. Owing to the different time of ossification, these cases are seen at any age between nine and eighteen years; the most frequent are those involving the anterior tuberosity of the tibia, and which may be considered as typical of the others. Tibial apophysitis begins suddenly with pain in one or both knees, of variable intensity, but sometimes very acute. On palpation the pain is strictly localized to the anterior tuberosity, which is felt to be thickened. General symptoms are absent unless the condition, instead of remaining an hypertrophic osteitis leading to the formation of a hyperostosis, should begin to suppurate. Tibial apophysitis is easy to diagnose: other forms may not be so; for example, when the disease affects the posterior part of the os calcis. In this case the patient, usually a child of thirteen to fifteen years, may have been lame for some time with pain at the back of the heel; some improvement may follow rest and the administration of sodium salicylate, but the pain and lameness reappear, and now the posterior third of the bone is found enlarged and tender at the insertion of the tendo-Achillis. Usually the other side is also affected, but to a less degree. But the diagnosis from tuberculosis is always difficult; the age of the patient, the slow appearance of symptoms, variations in the pain, and its increase after walking, are symptoms common to both diseases. Hardivillier says that tuberculosis of the os calcis usually occupies the anterior part of the bone, that it does not lead to bony hypertrophy, that it is generally unilateral. The diagnosis of vertebral apophysitis is more easy. An abnormal and painful swelling is formed by the hypertrophied tuberosity of the spinous apophysis of the vertebra, the pain is strictly localized; the absence of contraction and curvature are sufficient to eliminate Pott's disease. Treatment is simple; in rare cases where suppuration occurs incision and curettage is necessary, but usually apophysitis does not suppurate, and rest with counter-irritants are sufficient to ensure quick recovery.—British Journal of Children's Diseases.

Excessive Susceptibility and Immunity.—In previously published papers Rosenau and Anderson have shown that horse serum is apparently a bland and harmless substance when injected into a normal guinea pig, but that a subsequent injection produces symptoms which may be serious to the point of producing death. The heightened susceptibility produced by the injection of a foreign serum is of extreme importance as related to the antitoxin treatment of diphtheria. In some further studies upon the subject (Journal of Medical Research, July) the same authors acquaint us with some further conclusions.

The changes produced by the first injection of a foreign proteid are possibly to be found in the central nervous system, and the reaction following the second injection of proteid material appears to be common to all the higher forms of albuminous substance, of whatever source. It is possible to refine antitoxic serum by precipitation and dialysis so that the same antitoxic strength is contained in one-half the bulk of serum. While this refined serum is quite as toxic, bulk for bulk, as the unrefined serum, there is a distinct advantage in using the concentrated product by reason of its reducing the amount of foreign proteid injected. It has been found that sera from various horses vary little, if at all, in toxic property; the apparent differences are dependent upon something connected with sensitizing action.

The authors' work indicates that supersusceptibility is either an essential element or one stage in the process of resistance to a certain class of diseases. They are convinced that further studies upon the phenomenon will have an important bearing upon the prevention and cure of certain infectious processes. The supersusceptibility obtained by bacterial proteids and the subsequent immunity furnish data for this belief. Supersusceptibility may easily be induced in guinea pigs with proteid extracts obtained from bacterial cells.

The first injection of such an extract seems to be comparatively harmless to the animal, but a second injection shows that profound physiological changes have taken place. The phenomena induced by the second injection are followed, in certain cases, by immunity to the corresponding infection. A definite period must elapse between the first and the second injections.

These results give a possible explanation of the period of incubation of some of the communicable diseases. Is it a coincidence that the period of incubation in a number of infectious diseases is from ten to fourteen days, which corresponds significantly with the time required to sensitize animals with a strange proteid? In certain infectious diseases with a short period of incubation, such as pneumonia, the crisis, which commonly appears in about ten days, may be explained in the same way. It is evident that disease processes produced by soluble toxines, such as diphtheria and tetanus, do not belong to the category now under consideration. The phenomena are not the same for all kinds of bacterial proteids, so that there is no general law applicable to all infections.—N. Y. Med. Journal.

Home Modification of Cow's Milk.—John Zaborsky (St. Louis Med. Review, Sept., 1907). In this paper the author sounds a warning note against the too high per cent. of fats in modified milk. He speaks of the new teaching that it is the fats rather than the proteids of cow's milk which the infant finds difficult to digest, and tells of the claims of the Breslauer school which insists that the curds found in stools formed by the salts of fatty acids, i.e., they are soaps and therefore they are not caseins; that proteids are easily digested and do not coagulate in hard masses in the stomach despite the test-tube proofs. Furthermore these fatty acids rob the infant of the alkalies needed for their proper nutrition, favoring a general acidosis. He himself points out that this must at least make the infant feeder cautious of fats and says that if the correctness of this theory is proven by further research we may go back to the now despised skimmed milk dilutions. The moderately high percentages of fat for healthy infants, however, are on a firm basis which he believes will never be changed, the success of which is vouched for by the thousands of healthy babies so reared. However the percentages should still be as carefully reckoned and he advises every practitioner to have a system for computing so that he may know the approximate value of every food he prescribes. He speaks of the advantages of top milk over either gravity or centrifugal creams, which are never of definite fat percentages and are usually full of bacteria. The top half of a tall quart jar of milk after standing 4 hours contains, he reminds us, 7 per cent. fat and 4 proteid, and if diluted a certain number of times gives us a definite per cent. of fats and proteids. For example, 16 oz. of diluent to 8 oz. top milk (a dilution of 3) gives us a modification of 2.3 per cent. fat, 1.3 per cent. proteid. He gives the most minute directions to mothers for keeping a good milk free from contamination.

ROGER H. DENNETT.

Heart Complication of Scarlet Fever.—EDDY (Amer. Jour. Obst., Oct., 1907), in discussing this subject, says too little attention has been paid to such a vital organ and that the small amount of literature on the subject is due not to the infrequency of this complication but to lack of observance.

As productive factors of heart complication in addition to the toxæmia of the pyrexial stage and the late toxæmias of nephritis, he considers as important ones, exertion as is found in the ambulatory cases, vomiting, the toxæmias of complications, especially oral, anæmia interfering with the nutrition of the heart muscle, and the direct action of toxins on the cardiac nerve supply.

The symptom may be sudden death from acute dilation, extreme pallor, præcordial pain, and rapid change from a strong to an irregular and almost imperceptible pulse, murmurs are frequently found, being chiefly systolic apical ones, but occasionally heard over the entire præcordium.

His treatment is chiefly preventive, every case being kept in bed three weeks, a liquid diet is enforced, especial attention paid to oral sepsis, and the skin should be kept active by frequent baths and emollients. Anti-pyretics should never be used, depending on hydrotherapy to control the temperature. He uses mild non-irritating diuretics throughout the disease.

When heart complications occur his treatment is chiefly symptomatic, enforcing absolute rest, bowel elimination, stimulation with strychnine and alcohol. Should not use digitalis where there is marked myocarditis.

The patient should not be allowed out of bed until the murmur, should one be present, has disappeared, and the pulse does not show marked acceleration on getting up.

E. F. Crofutt.

Case of Diffuse Muscular Atrophy with Very Rapid Course in an Infant.—C. Comba (Monatschr. f. Kinderheilk., Bd. v, S. 251) read the notes of this case before the Bologna section of the Italian Society for Children's Diseases. The patient, a female child, showed the first symptoms at the age of 3½ months. The atrophy began in the lower extremities and rapidly spread to the arms, body and neck. Death took place from broncho-pneumonia at the age of six months. Two female members of the patient's family had previously died in the same way in the first few months of life. As to the classification of the case, whether it belongs to the Werdnig-Hoffmann type or to the Mya-Luisadi type, the author reserves his opinion till after a histological examination.—British Journal of Children's Diseases.

Digestion and Feeding in Infants.—A. Dingwall Fordyce (The Scottish Med. & Surg. Journ., Oct., 1907). This paper deals with the effects of various degrees of heat upon cow's milk, and with the effects of sodium citrate. Three degrees of the heating process are spoken of: Pasteurization or heating to 70 degrees C. for twenty minutes, scalding or bringing to the boiling point, and prolonged boiling. By Pasteurizing we destroy the lactic acid bacteria and most of the pathogenic germs of the infectious diseases, while tubercle bacilli, spores and fermenting bacteria survive. It is therefore of use (even when not contaminated later) only when done immediately after milking, and used within six hours. In scalded milk all but spores are destroyed, while milk kept at 110 deg. C. for 15 minutes is absolutely sterile. Eighty-nine rats 21 days old were divided into four groups and fed on four different milks, viz., bread and milk, raw milk, pasteurized milk and boiled milk, and their progressive weights tabulated for 42 days. The results were entirely negative as all did equally well. The thyroid glands of those fed on pasteurized and boiled milk were pale, and microscopically showed variations from the normal.

Upon the addition of rennet to the 4 milks pasteurized had a more flocculent curd than raw milk, scalded milk still more so, and boiled milk most of all. The artificial digestibility, as shown by the addition of pepsin, and acids at body temperatures, was diminished in pasteurized milk, and still more so in scalded and boiled milk. This, however, is of less importance when he reminds us that the flocculent curds more readily pass through the pylorus to be digested. Fats are little altered in pasteurized, and scalded milk, but the emulsion is destroyed in boiled milk and the fat globules run together. The ferments are probably destroyed by all three degrees of heat, the importance of which is not yet definitely settled. There is no evidence that any of the degrees of heat cause either rickets or scurvy. However the author finally states that it is his opinion that clinically the general health and development is better in infants fed on raw milk.

Citrated milk, or the addition of 1 gr. of Na. Citrate to 1 oz. of milk, the author believes is a valuable adjunct to infant feeding. Curds with rennet are far more flocculent, while the digestibility as tested in boiled milk is not impaired. The calcium salts are altered, but it is not proved that they are not absorbed. To discover if there is a lack of calcium and consequent danger of rickets in children so fed, the author fed rats upon a strongly citrated milk. He found no change in the bones at the end of 13 weeks.

Roger H. Dennett.

Treatment of Acute Cardiac Affections in Childhood.—Adolf Baginsky (Medical Record) finds that acute cardiac affections occur in children in about two and a half per cent. of the patients that are admitted into the Kaiserin Friedrich Hospital of Berlin, not including the cardiac complications of diphtheria and scarlet fever. He describes two cases successfully treated by himself. Pericarditis, combined with endocarditis in one case, were not cured by rheumatic remedies or cardiac stimulants, until to them was added the use of iodide of potash internally, and mercurial inunctions externally. These remedies succeeded in removing the bad symptoms in a comparatively short time, and the patients were restored to a fair degree of health. There was a surprisingly rapid absorption of the serous exudate. The author believes that when there is an exaggerated amount of fluid in the pericardium, exploratory puncture and aspiration are useful to relieve pressing dyspnea and heart weakness. Vesicants over the cardiac area he believes to be too cruel a measure to use in children.—The Columbus Medical Journal.

A New Diagnostic Sign in Typhoid Fever.—Elsewhere we have spoken of the value of a local reaction in the skin and conjunctiva against tuberculin as a diagnostic sign of tuberculosis, but it appears that the principle involved in this process has been found applicable in the diagnosis of typhoid fever, and it may be also in that of other infectious diseases. Chantemesse, in a note in the Gazette Médicale de Paris of September 15, 1907, states that he has found the method of service in the case of typhoid fever. He prepared his vaccine material by precipitating the typhoid toxin from a strong solution by means of absolute alcohol. One milligram of the powder so obtained was dissolved in fifty drops of sterile water, and in making the test one drop of this solution was instilled into the inferior conjunctival cul-de-sac of one eye. In healthy persons, or those suffering from some other disease than typhoid fever, a little redness of the conjunctiva with some lacrymation appeared in two or three hours, but disappeared at the end of four or five hours, and the following day there was no difference to be seen in the conjunctivæ of the two eyes. In typhoid patients, or those convalescent from the disease, the reaction was much more marked. It attained its maximum in from six to twelve hours, and was still apparent the following day. The reaction was characterized by redness of the conjunctiva, lacrymation, and the production of a serofibrinous exudate. The difference in the two eyes was apparent the following day, and could usually still be detected at the end of two, or even three days. Basing his belief upon the results observed in a large number of experiments, Chantemesse ventures the opinion that this method of ophthalmodiagnosis is devoid of danger and is of definite diagnostic import. Whether it will enable a diagnosis to be made in the very early stages of the disease he is unable to state from observation in the human subject; he obtained, however, a positive reaction in the eye of a rabbit which had received a subcutaneous injection of a typhoid culture only forty-eight hours before, while a similar instillation in the eye of a healthy rabbit was negative. If, as is probable, an ophthalmo-reaction can be elicited in other infectious diseases, and especially if it is positive in the early stages of these affections, we shall be in possession of a method of diagnosis far superior to the diazo-reaction or even to the Widal test—superior by reason both of its certainty and of its simplicity and readiness of application.—Medical Record.

Irregularity of the Pulse in Diphtheria.—O. H. PETERS (The Lancet, Sept. 14, '07) claims that irregularity of the pulse in diphtheria in children is really of little special significance, being due to the great incidence of the disease in the early years of life, especially the fourth and fifth years. Children at this age, he says, commonly exhibit this symptom in any febrile disturbances and often in apparent health. The irregularity is very common indeed, it being found in over eighty per cent. of the author's cases. Comparisons of similar numbers of diphtheria and scarlet fever cases showed about the same percentage of cardiac irregularity. The irregularity is referred by various authorities to a nervous origin rather than a cardiac. There seems to be an excessive susceptibility in the inhibitory action of the vagus, and it is believed that the rhythmical stimulation of the respiratory center has a rhythmical effect on the vagus center. Peters refers to Barr's explanation versus the mechanical effect of the respiratory act on the circulation. The fall in blood pressure in disease is undoubtedly the primal cause setting up the irregularity. If actual myocarditis is present an irregular pulse is of course of the gravest significance. In most diphtheria cases with irregularity the latter continues during hospital stay and the children are kept in bed week after week when they would do better if in the open air, which would certainly improve their anemia. We must first carefully assure ourselves that the irregularity is more than respiratory. The presence or absence of cardiac signs will help decide this point.—Medical Record.

An Epitome of Life.—A physician, writing in a Parisian medical journal, gives the following summary which he offers as a definition of human life: First year, infantile complaints and vaccination; second year, teething, croup, infantile cholera, and convulsions; third year, diphtheria, whooping-cough, and bronchitis; fourth year, scarlatina and meningitis; fifth year, measles. By now half the children are dead. The others live on as follows: Seventh year, mumps; tenth year, typhoid; sixteenth year, chlorosis and spinal irritation; eighteenth year, neurasthenia; twentieth year, cephalalgia, alcoholism, and vertigo; twenty-fifth year, marriage (considered, presumably, as a disease). In the twenty-sixth year, insomnia; thirtieth year, dyspepsia and nervous asthenia; thirty-fifth year, pneumonia; forty-fifth year, lumbago and failing sight; fifty-fifth year, rheumatism and baldness; sixtieth year, amnesia, loss of teeth, hardening of arteries; sixty-fifth year, apoplexy; seventieth year, amblyopia, deafness, general debility, loss of tone in the digestive organs, and gouty rheumatism. For the seventy-fifth year is given death, no doubt a consummation devoutly to be wished by anyone who has passed through this list of vicissitudes.

Scarlet Fever.—American Medicine, for July, asserts that all attempts to produce a specific serum for scarlet fever have ended in failure. Some success, however, has followed the use of Moser's polyvalent serum in which nearly 30 different strains of streptococci are employed. The majority of observers report good results from the use of the serum. These good results apparently arise from the fact that in several cases at least the symptoms fall under two classes: (1) Those due to the specific scarlatinal infection, and (2) those due to secondary streptococcic infections, to which the scarlet fever patient seems peculiarly susceptible. Moser's serum acts upon the second class of symptoms, averting or lessening the secondary complications. It is recommended to use the serum as a routine measure in all severe cases. The best results are obtained when used the second or third day. The dose is from 100 to 200 ccm. The failures seem to be due to its being used too late or the serum being of too low a potency. The only objectionable feature is the frequent occurrence of an urticaria, or erythema.—Cleveland Medical Journal, Oct., 1907.

The Prophylaxis of Scarlatinal Nephritis.—THOMPSON (Edinburgh Medical Journal, Feb., 1907) reaches the following conclusions:

Scarlatinal nephritis is a distinct part of the disease, and should not be looked upon as an inevitable sequela, which presents itself in a certain percentage of cases; and as such it should be open to treatment.

The only form of treatment that is likely to be of any real value in counteracting the nephritis is the prophylactic, the object being to kill outright, or to weaken the virus by a substance which is in itself harmless; and as the virus is in the general circulation at the beginning of the disease, it must perforce be present in the kidneys and urinary system.

With regard to the use of a prophylactic drug against the nephritis of scarlatina, the only one thus has proved itself to be of any value is urotropin. It is true that urotropin has the distinct advantage of being used in cases in August and the first eighteen days of September, which is a time that the nephritis percentage is usually low. But the fact that of the forty-seven consecutive cases treated with urotropin not one had nephritis, and only one had albuminuria, is in the author's opinion, encouraging enough to suggest the further use of the drug in scarlatina.

And therefore, finally, he suggests that all cases of scarlatina should be treated from the beginning with five grains of urotropin thrice daily for children up to twelve years, and for patients above that age 7½ grains thrice daily. In the administration of the drug, the importance of dilution with water must not be overlooked; and the author recommends that the treatment should be continued to the end of the twenty-eighth day of the disease.—St. Louis Medical Review.

Pneumonia in Children.—FREDERICK TAYLOR, M.D., F.R.C.P. (British Journ. of Children's Diseases). This article takes up the various phases of pneumonia in children; (1) The relative frequency of lobar and broncho-pneumonia; (2) the mortality and prognosis of the two conditions, and (3) treatment. It consists of a résumé of the recent literature by various prominent pediatrists together with a series of his own at Guy's Hospital, followed by his own deductions from the whole.

(1) After pointing out the fact that all these writers agree

that it is necessary to show that lobar pneumonia is far more frequent in infants than is commonly supposed, he quotes among many others Morse of Boston, and his own countryman Clive Rivière. The former had a large series in which lobar pneumonia occurred three times to broncho-pneumonia's once, while in Rivière's series the reverse was true, 3 cases of broncho to one of lobar. From these and other discrepancies Taylor concludes that lobar pneumonia occurs in infants much more frequently than was the current belief a few years ago; that there are probably considerable differences in the incidence of the two forms occurring at different times and in different places, possibly liable to variations from epidemic or other considerations; that broncho pneumonia is very much less frequent after three years of age.

(2) Of prognosis he says he would not attach too much importance to the fact that many writers report a far greater mortality in broncho than in lobar pneumonia, because of the enormous variations in different places and at different times. Therefore very little reliance could be placed on the recovery of an individual case if the mortality of that particular time and place happened to be the 27 per cent. of one writer instead of the 1 per cent. of another quoted. In the same way he concludes that the leucocytosis may fail us as it often does in our individual case. Of lumbar puncture he says the results so far have not been very helpful.

(3) As to treatment, he says the analogy of treatment in other acute infectious diseases would not lead us to use the cardiac depressants, aconite, antimony and veratrum viride. Expectorants can be of only secondary importance in lobar pneumonia where the fibrinous deposit is absorbed, and not spat out. In broncho pneumonia it has been his practice for many years to use expectorants almost exclusively, ipecac and ammonium carbonate, believing it to do more good by modifying the secretions than by driving those already formed out through the larynx. He thinks the present generation will be exposed to as much criticism for treating a case in a cold room with the temperature at 28 deg. F. as the former generation now is for the "coddling system" where the child was confined within 4 canvas walls deluged with the vapor and steam of boiling kettles close by.

ROGER H. DENNETT.

The Composition of Human Milk and Its Chemical Analysis.—H. LESCŒUR (Le Nord Med., July, 1907) says that the apparent lack of total solids in some specimens of human milk that are analyzed to ascertain their powers of nutrition, is due to the absence of a sufficient amount of cream. Now, it is noticeable that specimens of cow's milk taken at different times during milking will vary in the amount of cream, especially if taken in the beginning of milking, the most cream appearing in the last portion of the milk. The samples of human milk are always small in amount, and are not drawn so as to give a sample from the whole of the milking. Thus the amount of cream is not a true index of the richness of the milk. The examination of the whey of the milk bears out this conclusion. Woman's milk coagulates without separating like cow's milk, and when filtered properly it separates into a precipitate and an opaline liquid. The density of this liquid is of great importance. If normal the density will be 1,036; if below par the density varies, while the quality does not vary materially. The density of milk is exactly proportional to the amount of solid matter contained. The chemical examination of human milk, then, is inexact and deceiving. Test of the whey, and determination of its density, is of value. The density, which varies between 1,026 and 1,033, serves as a practical basis for the classification of milk and its nutritive value. Variations depend on age of the milk, return of the menses, pregnancy, and sickness, and these affect especially the quantity and not the quality of the milk. In case of defective nutrition, substances may pass into the milk which will affect the health of the child, but these cannot be discovered by chemical analysis.—American Journal of Obstetrics and Diseases of Women and Children.

The Treatment of Diphtheria with Refined and Concentrated Antitoxin.—A. Haberness, M.D. (St. Louis Med. Review, Aug., 1907) strongly recommends the use of a serum from which the inert and deleterious principles have been removed. He describes in detail the method of separating and discarding all non-proteid substances, albumins, nucleo proteids and some inert globulins, and of reducing the serum one-half in bulk. The irritating effects caused by antitoxin (having nothing to do with diphtheria per se) are urticaria, erythema, petechiæ, scarletiniform and morbilliform eruptions. Erythema multiforme, the joint affections and anemia are less frequent and occasionally bowel symptoms and pelvic involvement in women. These usually occur where large doses have been used. The advantages as shown by the statistics of the N. Y. Health Department in 1,000 cases and in his own 75 cases are: (1) Reduction in number of rashes of 50 per cent., the other 50 per cent. being much milder in character. (2) The diminished bulk permits more rapid injection in irritable children and less pain and swelling. (3) The refined serum is not so thick and a smaller needle is consequently used, causing less irritation. (4) Larger doses are used at first with the result that only one injection was necessary in 72 of his 73 cases. (5) It is therefore less expensive. (6) Its freedom from coloring matter and small bulk permits of its introduction as an improved and innocuous remedy for the cure of diphtheria, and thus we may combat the deep grounded belief of the laity that antitoxin is harmful and dangerous.

As to sudden death, he reminds us of the fact that it may occur in various diseases of children and in proof of this relates three cases of scarlet fever and measles. Therefore he surmises that it is a coincidence rather than a cause in antitoxin inoculations. ROGÉR H. DENNETT.

Psoriasis in Children.—DR. CARL LEINER (Amer. Journ. of Dermatology, July, 1907). Psoriasis in children is rare, but when seen, it usually presents the same characteristics as it does in the adult. The author reports a case in a child of six months which is of interest (1) On account of the extreme youth; (2) on account of the absence of the characteristics of the disease.

The infant had a patch on the right cheek, near the angle of the mouth, another on the left cheek and one on the chin. On the body were numerous isolated spots covered with white scales, which when removed by the finger nail showed the characteristic bleeding points. On the extremities only a few patches. While the dorsal sides of the elbows and knee joints were free, it was remarkable that the palms and soles were affected.

Another peculiar feature was, that after the healing of some of the spots on the abdomen, depigmented spots were seen. This leucoderma psoriaticum is exceedingly rare.

B. F. OCHS.

Value of Antitoxin.—In the weekly bulletin issued by the health department of Chicago for the week ending Saturday, particular stress is laid on the value of antitoxin in fighting diphtheria. The bulletin says: "No child ever did die—no child ever will die of diphtheria to whom a full dose of antitoxin is administered on the first day of the disease. Reports for the week show a continued decrease in the number of infectious diseases. The number of cases of diphtheria reported was 150, being 60 fewer than was reported the previous week.

Chloral Hydrate in Scarlet Fever.—B. Franklin Royer, M.D. (Pennsylvania Medical Journal), analyzes 800 cases of scarlet fever treated with routine doses of chloral hydrate and contrasts them with 752 cases treated with the usual remedies. His conclusions are as follows:

(1) The drug is of distinct value and when given in doses sufficient to secure light sleep does not seem a circulatory depressant. (2) Ameliorates nervous symptoms better than any remedy yet suggested. (3) Allays itching often found annoying. (4) Post febrile nephritis is less frequent. (5) Study seems to justify a more extended use of the drug in scarlet fever and a more detailed study as to how it acts on the kidney itself.—The West Virginia Med. Journ.

Dermatitis Herpetiformis in Childhood. Report of a Case in a Child of Six Years.—F. C. Knowles, M.D. (Journ. Cut. Dis., June, 1907) gives a complete bibliography to date on this disease, of the cases reported occurring in childhood. The chief points of interest in the case he reports, which occurred in a girl six years of age, are, that the eruption began seven weeks after vaccination, the large percentage of eosinophiles in the blood (33 per cent.) and the excess of indican in the urine. The chief points of difference between dermatitis herpetiformis in childhood and in adult life are:

(1) Itching as a marked symptom in the former is usually absent. (2) Marked multiformity of the lesions is usually absent. (3) Grouping is but seldom seen in patients under puberty. (4) Pigmentation as a sequela was present in less than one-fourth of the cases.—St. Louis Medical Review.

Poisoning by Sodium Salicylate in Children.—Martinet (La Clinique Infantile, Aug. 15, 1907) calls attention to the frequency of untoward effects from sodium salicylate in children. Eye disturbances, delirium, cardiac derangements, are common. He discusses the condition at some length and summarizes his conclusions as follows: (1) Sodium salicylate sometimes produces in children a clinical syndrome resembling diabetic coma (exhaustion, dyspnœa, coma, acetonæmia). (2) The toxic dose is variable, and seems above all to depend, apart from individual idiosyncrasy, on the functioning of the bowels. (3) Acetone appears in the urine and in the expired air. Its presence constitutes one of the first symptoms of the affection, and may be considered a veritable danger-signal. (4) Treatment consists essentially in decreasing the acidity of the urine by the administration of large doses of sodium bicarbonate, and in obtaining free intestinal evacuations.

Pseudo Leucaemic Anaemia and Rickets.—D'Espine and Jeanneret (Le Progres Medical, Aug. 24, 1907) report the cases of two rachitic twins thirteen months old, both of whom succumbed to broncho pneumonia, and both of whom, as was demonstrated by autopsy, were affected with pseudo-leucæmic anæmia. The blood of one examined at various times during life showed a very marked myelæmia, characterized by the large proportion of nucleated red corpuscles and megaloblasts, and by the presence of myelocytes. Splenomegaly and the anæmia completed the picture, and made one think of an acute atypical myelogenous leucæmia, which, however, was not confirmed by autopsy. The interesting fact about the etiology is the presence of the same disease in both twins, who were likewise affected with rachitis. The father, mother and the other children were all afflicted with the same malady.

Reflexes in Children.—Laurent (Thèse de Toulouse, 1905). The author made an investigation of the evolution of reflexes in 110 children whose ages ranged from a few hours to three years. He found that tendon reflexes in the upper limb generally exist in the healthy child till the age of three years and then gradually disappear. Wrist clonus was occasionally present in the first three weeks of life apart from any pathological affection. The knee-jerk was much exaggerated until the seventh month, and then gradually diminished. The ankle-jerk was always less active than the knee-jerk. Ankle-clonus was frequent during the first three weeks of life, but very rare later in the healthy child. Babinski's sign was constant during the first six months. From that period till the age of fifteen months it alternated with the normal plantar reflex. After fifteen months it was very rare except pathologically. Until the age of one year it was often accompanied by the fan sign. Total absence or diminution of the cutaneous reflexes in the young child was not rare. They were never exaggerated, but a very great extension of the zones of excitation was present. This extension of the reflexogenous zones tended to disappear between the ninth and fourteenth month.

BOOK REVIEWS

THE CLIMACTIC TREATMENT OF CHILDREN. By Frederick L. Wachenheim, M.D., Chief of Clinic, Children's Department, Mount Sinai Hospital Dispensary, N. Y., 400 8vo. pages, cloth bindings, $2.00 net. The Rebman Company, 1123 Broadway, New York City and London, Eng.

This subject in so much as it relates to the diseases of children is one that has long been neglected by modern writers, and it has remained for the author to cover this most valuable means of cure in a remarkably thorough manner. Dr. Wachenheim must have spent much time and labor in compiling the records necessary. The seven chapters are devoted to first General Principles followed by Climatology of Temperate North America; Health Resorts; The Climatic Management of the Normal Child; Constitutional Diseases; Viseral Diseases, and finally, Scrofulosis and Tuberculosis.

To the doctor sending children away from home this work will be of the greatest service.

FOOD: ITS RELATION TO HEALTH AND DISEASE. By Ephraim Cutter, M.D., A.M., LL.D., and John Ashburton Cutter, M.D., B.Sc. The Gazette Publishing Co., New York, 1907. Octavo, cloth, pp. i.-xiv., 1-3. 84; $1.75.

This work treats over eighty foods, in their relations to chemistry, morphology, physiology, condition of users, goodness or badness, sole and manifold feeding, action on various tissues as to building or destruction, religion, climate. The present day physiology and psychology are co-ordinated in a chapter on Spiritual and Mental Kingdom Foods; also special chapters on Alcohol, Fermentation, Changes in Food by Cooking, Food in Acute and Chronic Diseases, and Surgical Affections, the Care of the Aged, Uric Acid and Summer Feeding. The work is a valuable contribution by men who labored for years in the application of food to disease.

MERCK'S 1907 INDEX. An Encyclopedia for the Chemist, Pharmacist and Physician. Published by Merck & Co., New York.

This valuable annual contains the names and synonyms; source or origin; chemical nature and formulas; physical form, appearance and properties; melting and boiling points; solubilities, specific gravities and methods of testing; physiological effects; therapeutic uses; modes of administration and application; ordinary and maximum doses; incompatibles; antidotes; special cautions; hints on keeping and handling, etc., the chemicals and drugs used in chemistry, medicine, and the arts.

This work may be had on application, and is most useful.

PEDIATRICS

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ORIGINAL ARTICLES

MOUTH-BREATHING WITH REFERENCE TO ITS DELETERIOUS EFFECTS.

By Daniel S. Dougherty, M. D.

LECTURER ON DISEASES OF NOSE AND THROAT N. Y. POLYCLINIC; ATTENDING OTOLOGIST AND LARYNGOLOGIST N. Y. CITY HOSPITAL; ASST. EAR SURGEON MANHATTAN EYE AND EAR HOSPITAL.

Much has been said and written upon this subject under various heads, such as "Mouth Breathing," "Adenoids," "Lymphoid Growths in Children" and "Nasal Obstruction," but too much emphasis cannot be given to so great a factor of health as free and perfect respiration.

What doses of anthelmintics and antimiasmatics have been swallowed and what punishments suffered by children in the past to correct symptoms that we now recognize not as worms nor malaria, but as the effects of a faulty respiration! Even to-day medical writers refer to the mouth-breathing habit and devise instruments of torture, plaster and straps, for the correction of a condition that is not one of habit but purely one of cause and effect.

Read by invitation before the Jenkins Medical Society of Westchester Co.

In the city of Copenhagen stand two statues erected by children, the one by the children of Denmark to Hans Christian Andersen, the other by the children of the world to Wilhelm Meyer. The lesson is obvious and contains the whole story. Andersèn wove beautiful fancies into entertaining tales for children while Meyer pointed the way for perfect enjoyment of them.

The statement is not far-fetched. Governments and Boards of Health are awakening to the facts and acting upon them and all physicians are admitting that a due recognition of the condition of the upper respiratory tract is essential to the proper maintenance of health.

It is not the intention of this paper to touch upon the causes of mouth-breathing, but rather to discuss those effects which it brings in its train.

In speaking of mouth-breathing we must take into consideration not only the actual respiration through the mouth and orapharynx, but also the lack of respiration through the nose and naso-pharynx, the one naturally including the other. We must, moreover, dismiss the idea that it is an affection of childhood, for although more prevalent and noticeable at that period of life, most distressing cases and results of mouth-breathing are frequently met with in adults.

The perversion of no other physiological function is attended with so lasting or painful results. Facial contour and expression, bodily structure, physical and mental development, general health, temperament and character may be more or less affected. The outward changes in the appearance of the face, the overshot upper lip, broadened roots of the nose, flattened cheeks, need not be discussed; they are but too well known.

Of more importance are the changes in the bony structure. The pressure of air in the mouth, not compensated for by pressure above in the nasal cavity, the force of the sucking inspiration, together with a lateral pressure of the cheeks, gradually change the shape of the hard palate and the upper maxilla. The palate becomes highly arched and narrowed, there is an elongation of the antero-posterior diameter of the superior maxillary, a corresponding shortening of its lateral diameter, and the alveolar process becomes elliptical with a consequent projection of the upper teeth over the lower and a crowding of the teeth together. As a further consequence of the high arching of the hard palate and its upward pressure, the nasal septum becomes deflected or in some cases split and thickened at the base.

These are the first apparent effects, but changes soon begin to appear in the form of the nose and in the accessory sinuses. Atresia and collapse of the nostril takes place; the ventilation of the sinuses is interfered with and physiological and structural changes affect these cavities. Changes also take place in the conformation of the chest. Nasal respiration is a natural, almost involuntary action of the chest muscles, while mouth-breathing is a labored action of the abdominal muscles; as a consequence of this, combined with an imperfect filling of the lungs, we have the narrow chicken-breasted chest with undeveloped muscles.

The functions of the nose are quadruple, respiration, phonation, audition and smell. The most important of these is respiration, in which function the nose acts as a warning, moistening, filtering and disinfecting agent. A deflection of the air current from the channel of the naso-pharynx to that of the ora-pharynx necessitates the breathing of air one or two degrees lower, dry, dust-laden and not disinfected. The mucous membranes of the mouth and pharynx become irritated and congested and pathological changes result. These extend to the larynx and bronchial tubes there giving rise to laryngitis, bronchitis (generally chronic), and in some cases asthma.

The laryngitis may be acute or chronic or more often subacute with recurrent acute paroxysms. In 300 cases of spasmodic croup seen by the writer in the Northwestern Dispensary, 270 were mouth-breathers, because of interfering post nasal growths. In adults chronic laryngitis is more prevalent, being further induced by the constant voice strain.

Changes in the voice are also worthy of mention. Together with the thickened mucous membrane and irritated cords we have a lack of tension, and as the accessory chambers are diseased and the nasal cavity shut off, tone and resonance are lost and the voice is husky and monotonous. The irritative tracheal cough, occurring with the onset of winter with its recurrent laryngeal symptoms can only be cured through making the respiratory channel normal.

While the tract below the pharynx thus becomes the recipient of too thorough ventilation, that above receives none. The accessory sinus fails of disinfection, normal secretions change in character and rhinitis and sinusitis result. The air in the rhinopharynx becomes rarified and a constant irritation, or, as it were, dry cupping, is constantly going on. The tissues become congested, the secretions undergo changes, as before stated, perhaps becoming muco-purulent; the eustachian tubes, deprived of dilating force (air pressure) soon collapse, and finally from a state of engorgement we pass to a stage of degenerative changes with plastic lymph and fibrous deposits. Thus, the middle ear is affected and the sense of hearing more or less sacrificed by catarrhal otitis media, acute, subacute or chronic, according to the severity of the cause and the length of the period of neglect of its removal. Or, on the other hand, the catarrhal condition may become an infected one and suppurative otitis ensue, with, perchance, all its sequelæ of mastoiditis, sinus infection and cerebral complications.

Severe as these local conditions may be, they are but secondary considerations to the deleterious effects upon general health. First among these may be mentioned that upon the nervous system, as through it the mentality, temperament and character of the child may be affected.

The sleep of a mouth-breather is a period of labor and unrest, more distressing, in fact, than during wakefulness. The sufferer sleeps by fits and starts and even then only the sleep of exhaustion. There is no period of complete, calm restfulness, and the child grows irritable, peevish and sensitive—the adult, neurasthenic.

Concurrent with this cause of nervous irritability we have certain cerebral symptoms. Normal inspiration has the effect of emptying the ethmoidal veins and through them the cavernous plexus, the longital sinus and collateral cerebral venous circulation. Failure in the proper performance of this, by reason of insufficient proper inspiratory force results in a damming back of the return circulation, with consequent pressure at the base of the brain and hyperæmia of the meninges.

Furthermore, a mouth-breather never empties his lungs to the normal extent. There is consequently a want of proper oxygenation and an insufficient elimination of carbonic acid gas, a vitiated residual air, and a resultant state of constant auto-intoxication. Thus we have the chronic effects on the system of slight but continuous carbonic acid gas toxæmia, and on the resisting and regenerative powers, of lack of oxygen.

Attention must also be drawn to reflex neuroses, especially those affecting the genito-urinary organs, productive of such symptoms as anuresis and premature sexual irritability.

Going beyond the diseases that might be classed under the head of nervous irritability or debility, neurasthenia, etc., many more serious and permanent changes occur, productive of chorea, epilepsy or even, it has been held, idiocy.

The mental effect is a strange one of contrasts; for examination of this class of subjects among children shows them to be either one of two extremes, exceedingly dull and stupid or prematurely bright. In the majority of cases, however, especially in the more typical ones, there exists a total lack of mental energy, of concentrative force and power of co-ordination. As a matter of interest in this regard it might be mentioned that even among those who are bright in other studies, mathematics seems to be a stumbling block.

Derangements of the digestive system may exist as sequences of perverted breathing. The nursing child, its mouth filled with the nipple and buried in the mother's breast, cannot nurse for any length of time nor with any degree of comfort. Its nourishment is not taken in sufficient quantities nor with any regularity, and oftentimes it refuses to nurse. On the other hand, at times it gorges itself. The delicate mechanism of digestion and assimilation is thrown out of gear and we have malnutrition and all the sequences of infantile indigestion. In children of a larger growth the food is bolted rapidly, large quantities of air are swallowed, and to relieve the dry, parched condition of the mouth and pharynx occasioned by cold, dust-laden air, an abnormal amount of fluid is taken into the stomach.

Take into consideration the comparatively enormous quantities of germ-laden muco-purulent discharges of the nose and nasopharynx that find their way into the stomach, and a cause for many gastro-enteric disturbances is readily found. Indeed, some have gone so far as to mention it as a probable cause of some cases of appendicitis.

The filtering and disinfection of the air in its passage through the nasal chambers are physiological properties that have long been recognized, but the germicidal action of the nasal secretion is a matter of but recent discussion. That certain bacteria are destroyed in this channel is now an authenticated fact. The mouth-breather has no such protection. As already stated, pathological changes have occurred in the mucous membranes of the mouth, fauces, and pharynx and their resistance diminished, thus making them, together with the congested, enlarged faucial tonsils, inviting portals for the entrance of disease germs. We must rememer that the resisting power of the general system is also lowered, especially by insufficient oxygenation. Pneumonia, grippe, the exanthemata and infectious fevers are among the effects of these conditions. Above all, the soil is ready and the way paved for the insidious entrance and growth of the tubercle bacillus.

The changes in the glands of the mouth and fauces and in the tonsil may affect the cervical gland and adenitis, simple or tubercular, result.

To especially mention all diseases and symptoms of which mouth-breathing is one of the chief causes would take far more time than could consistently be covered by this paper.

Now, just a word as to its effects upon the temperament and character of the child. Some of these have been touched upon in speaking of mental effects. The peevish, irritable condition grows upon the child as it gets older; arrested physical and mental development begin to show results. It notices that it differs from other children, cannot take part in their plays and sports, fatigues easily and loses interest. It becomes sensitive to these impressions, unhappy, and shows a tendency to shun companionship; and the mouth-breathing child slowly develops into the sullen, ill-tempered, selfish adult.

A disposition to sulk alone all day, combined with long, restless, laborious nights, oftentimes gives rise to morbid thoughts, hence the masturbation so prevalent among this class of children. As the child recognizes its defects and becomes envious and jealous, so may result the adult whose hand is against everyone and to whom law and order are but things to scorn.

Criminologists have long looked upon mouth-breathing as a primary cause of evil tendencies in the young and the French Government has investigated the matter with interesting results, proving a large percentage of youthful criminals and degenerates to be mouth-breathers. French school children have been made the subject of medical investigation along these lines and lately the German government, I believe, has appointed officials for this purpose.

In our own country Boards of Health have at last been aroused to the necessity of taking action for the correction of these evils, both in individuals and in communities. In New York City the Health Department has instituted a rigorous examination of all public school children and those with adenoids, hypertrophied tonsils or any symptoms indicating possible obstruction to free respiration are given cards and sent to have the faults corrected. Thus they expect the men and women of the future to be more perfect specimens of mental and physical health, better fitted in every way for individual duties and good citizenship.

In these few paragraphs the writer has endeavored to avoid entering into any elaborate explanation of physiological or chemical action or reference to physical mechanism such as might interest the specialist; but has had the sole object of briefly and colloquially setting forth the principal points of our subject as interesting to all medical men.

The statements are not overdrawn, although few cases are typical. The individual may suffer from one set of symptoms or another, but the effect is marked in all. Hygienic home surroundings, fresh air and out of door life serve to lighten even severe symptoms, while unsanitary tenement house life will necessarily serve to intensify the symptoms of those whose affection is mild.

In conclusion I would say that, while an early correction of defective respiration and a consequent avoidance of these deleterious effects cannot be too strongly urged, a study of several hundred cases in hospital and dispensary practice leads me to doubt the statements of those extreme theorists who seem to hold that wayward youth can be cured of all evil thought and intent by the mere removal of adenoids. As far advanced as surgery is, we have not yet reached that point where the knife can change habit and character more or less definitely formed. Bend the twig; the tree yields but little to directive force.

259 West 45th Street.

THE USE OF THE BIER-KLAPP METHODS OF HYPEREMIA IN INFECTIONS OF CHILDREN.

By J. N. Vander Veer, M. D.

For one to accurately understand the use of these methods in general, and their use in diseases of children in particular, it is necessary for him to know the pathological processes which are under way in the body proper of the patient.

When we look at an infection, from a calm and cool standpoint, it must be admitted that we deal with two factors; namely, the presence of bacteria within the body local or general and the factor of how much resistance this same body general can offer to the infected area. The first of these in life has to be dealt with from the standpoint of the bacteriologist; the second is dealt with not so much from the standpoint of the bacteriologist as from the standpoint of the physiologist and especially the general physician, who knows the peculiar idiosyncrasies which the body of his patient of long standing, possesses. It can be said that there are many families who present certain traits or characteristics regarding certain diseases, and that these traits are passed on from parent to child. Therefore, the use of some standard method of treating certain diseases in general, in certain families, must be of infinite value to the profession. In this way is the Bier-Klapp method of extreme value to the general practitioner, and at the same time to the specialist in children.

Perhaps a slight description of the two methods may not be amiss, as there seems to be somewhat of a misunderstanding regarding the two outlines of treatment. The method of constricting various parts of the body, in order to produce a passive hyperemia, was first thought out and promulgated by Prof. Bier, of Bonn. This is the method whereby an Esmarch bandage is applied and kept on for varying lengths of time. The second method was devised also by Dr. Bier. but perfected somewhat by Dr. Rudolf Klapp, his assistant in the Out-Patient Dept. This was the method of cupping, so much in vogue among our forefathers, but now utilized with an added and up-to-date knowledge of bacteriology, thereby answering in a large majority of cases the why and wherefore of the cup, and furthermore improved by Dr. Klapp, who suggested the puncture of the infected area, in order to liberate the sera, bacteria and toxins themselves.

The pathologist teaches us that an infection may spread in three ways: by contiguity or destruction of the adjacent tissues through direct infection, by means of the lymphatic system, and the blood system. One can imagine that an infection may spread also by contiguity or along certain well-defined channels, such as tendon sheaths and between layers of muscle.

In the spreading of an infection two factors are to be considered as of great import; namely, that the toxins are the substances which create the most havoc, giving the high temperature, frequent pulse, and prostration with its accompanying sequelæ. Looking further back than the toxins, we must appreciate the second factor, the manufacturers of this poison, the bacteria. In but few cases do we find the bacteria themselves spreading beyond certain well-defined limits, it being nature's object and desire to limit their action in general. But we find in most cases of infection by whatsoever bacteria we may name that the toxins seem to overcome nature's efforts and to spread without regard for her, throughout the general system. Next, from the consideration of the standpoint of nature's resistance to these invading processes, we note that she attempts to confine the bacteria within certain limits, creating hyperemia of the part herself, and she imports to that infected spot many white cells and much serum, for the purpose of liquifying and destroying the invaded tissue with its accompanying enemy. The white cells are called upon to act as scavengers of the body.

In this consideration of the local condition, by making a blood count we note that nature is preparing the other parts of the body as well to resist an invasion by the enemy, by increasing the number of leucocytes in the body.

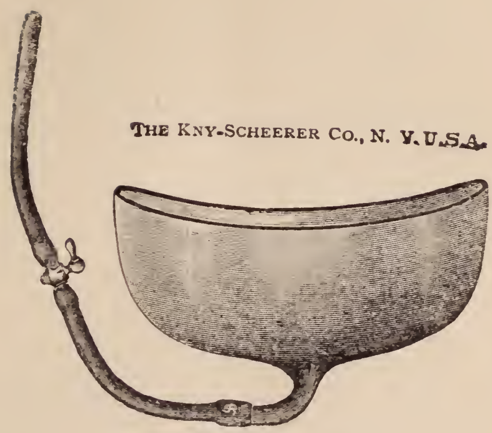
The application of a bandage around a part, as, for instance, an extremity, can be looked upon as producing many changes in the part. First, it limits the return of the venous blood; second, it constricts the lymphatics, thereby tending to reduce or absolutely forbid the passage of toxins from a distance into the body; third, from the increased stasis in the part, there is an increased deposit of leucocytes, sera and red cells. But from nature's added protective efforts there is still further an increase of these elements in the part, due to nature's desire to fight the enemy in general. At the point of infection we notice that there is a slowing of the blood current, with the usual phenomena of inflammation present. The white cells take their places near the vessel walls, and then by means of diapedesis, pushing or pulling themselves through the walls proper, they come freely into the surrounding tissue and there occurs a dialysis between the serum within the vessel and the toxic-laden serum outside of the vessel, thereby allowing the system in general to take up some of the poison and excrete it through other channels.

Speaking from a broad standpoint, there comes the necrosis in the part, whether a bandage has been applied or not, a liquefaction of the tissues and the attempt at formation of a sinus toward the outside, this being part of nature's efforts to extrude through other than the regular channels the poisons which she herself has produced within her own domains.

It was Dr. Klapp's idea to puncture these infected areas and thus aid nature in her efforts, which, coupled with the method devised by Dr. Bier, makes an excellent way of treating such an infected area, inasmuch as the cup acts as a pump as well, and thereby helps to withdraw the infected material.

In the use of the cup or the bandage, one must bear in mind that nature has deposited a wall of protecting leucocytes away from and yet completely surround the scene of battle, and that this protective wall of leucocytes must not be interfered with by frequent manipulation, else the efforts will be thwarted and the infection will be spread further and further.

The bandage should only be applied with moderate pressure, sufficient to cause a slight bluing of the skin and a feeling of fullness in the fingers or toes, *and never should produce pain.* The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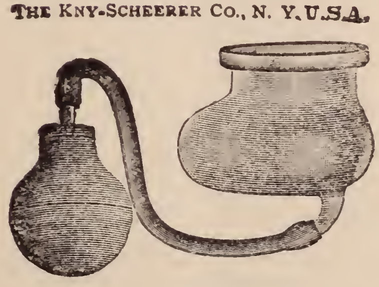
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To illustrate Dr. Vander Veer's article.

cup, on the other hand, should only be applied with so much suction as is necessary to cause a tingling in the part, else blood will be drawn at the first treatment and the very thin and fragile wall of leucocytic protection will be broken down.

It has been the pleasure of the author of this paper to treat some few cases in children, of infection by various bacteria. The majority of these infections have been of the common staphylococcic variety and have readily yielded to one or the other of the two methods. His experience in tuberculosis of the extremities has not been great because of the fact that we still adhere, in America, to the principle of treating such conditions by means of the Plaster-of-Paris bandage, thus immobilizing the part and allowing nature to produce her own hyperemia.

It might be well in such a paper to cite several instances of the use of the apparatus, in order to portray the manner of application. And first let me say that we probably as a profession, do not give as much weight to the examination of infections in children as we should, mostly because of the child being unable to give as accurate answers regarding his or her feeling and the symptoms that are noted by the patient. In this connection we should also note that the majority of physicians are not cognizant of the exact bacteria present in the infection, and that we have to deal usually with bacteria that are polyvalent, and after a certain length of time with a focus of infection that is of mixed character.

Case I was of a little girl who presented a hematoma the size of an egg on each buttock. She was six years of age, and although bright and apparently intelligent in noting her surroundings, she was unable to furnish a clear history of the manner in which the hematomata were first produced. A tentative diagnosis had been made of abscess situated deep within the buttocks, but the blood count made before the examination showed only a normal number of leucocytes present. Incisions were made in each tumor and some three ounces of blood evacuated from each cavity. Unfortunately, the location of the cavity on the right side was close to the anus, which forbade of keeping it absolutely clean, and there occurred an infection of this wound. The Bier cup in this case was applied consecutively for five days following the first signs of infection. A culture taken at first of the discharge showed simply the colon bacillus. Each day the cup was applied for twenty minutes in periods of five minutes' application and three minutes rest, and the child was enabled to tell when the suction was too strong. Cultures taken from the wound on the third day showed that staphylococci were also present, and we, therefore, had a mixed infection. The wound did not break down, because of the immediate use of the Bier cup, I believe, but was limited to a small sinus extending into the cavity, and a cup sufficiently large to cover the whole area involved could be applied satisfactorily. At the end of five days the discharge had practically ceased, and the use of the probe, very gently inserted, showed that the cavity was practically obliterated and that the sinus had commenced to close. At the end of ten days there could be noted absolutely no difference between the two wounds. A collodion dressing had been used on each wound, but that on the right side had been disturbed and it was therefore judged that the infection originated by reason of the displacement of the dressing.

The second case was that of a boy of four years of age who had sustained a compound comminuted fracture of the elbow joint, whereby a severe infection made its appearance on the fourth day after the accident. The patient was treated at home for some two weeks and was then sent to the hospital, with the idea of an amputation of the arm being necessary. His temperature at that time was 101, the leucocytic count 16,000, and the little fellow presented all the symptoms of a severe infection. A thorough opening was made into the joint and through-and-through drainage was established, with the use of a splint to immobilize the part extending well up to the shoulder. A small Esmarch bandage was made and this was applied around the arm as close to the shoulder as was feasible, and the arm was placed in continuous irrigation. The outcome of this case showed a rapid decrease in temperature following the surgical intervention, as well as diminution of the exudation of pus and in the leucocytic count. The patient experienced no delirium after 36 hours. An adenitis of the axilla disappeared, although slowly, and after some four weeks the splints were removed from the arm and sufficient motion was present to warrant the prognosis that the elbow joint would eventually prove to be almost as motile as in the normal side.

These two cases serve to illustrate the uses of the method in such conditions where surgical judgment should be of the highest service. It might be said that in the use of the Bier bandage in the clinic at Bonn no case is put down as cured, where motion has been interfered with in the beginning, until full motion has been restored to the part involved; and it is the hope of those who use the method that the old familiar forms of stiff joints may largely be obviated and full power restored to the parts.

The methods are of the greatest importance to the general practitioner who is somewhat distant from his case, as the manner of application can easily be learned by members of the family, thus rendering them of particular service in aiding the physician and offsetting numerous visits which are necessary when conditions of this matter are presented.

Serum Treatment of Diphtheria.—Writing in the Gazeta dos Hospitaes do Porto, Aug., 1907, on the occurrence of diphtheria in Oporto, Souza—who recognizes three clinical forms of the malady, and points out the variation in their proportional incidence in different years—shows that an extraordinary advance has been made in that city in the percentage of recoveries. A free antidiphtheritic service has been in existence for some years; and though previous to 1903 the statistics cannot be regarded as entirely trustworthy, it appears that in that year the case-mortality was approximately 18.5 per cent. For the following years the figures are completely reliable, and show that in 1904 the corrected mortality was 11.2 per cent., in 1905 it had fallen to 6.52, and last year to 3.21, a figure of which the staff may be justly proud. Souza claims that these favorable results are entirely due to the employment of very large doses of serum. In 1904, only tentatively using increased doses, the mortality did not fall below 11 per cent.; but in the two following years a bolder treatment was adopted, and with excellent results, as the following figures show, M representing the quantity of serum corresponding to 1,000 antitoxin units:

Year	Reduced Mortality	Average Dose
1904	11.20 per cent.	4.09 M.
1905	6.52 per cent.	5.83 M.
1906	3.21 per cent.	7.29 M.

—Brit. Med. Journ., Oct. 12, '07.

THE VALUE OF CERTIFIED MILK.*

By Walter G. Murphy, M. D.

The general plan of Certified Milk, as outlined by the originator, Dr. H. L. Coit of Newark, N. J., at the International Pure Milk Congress held at Brussels in September, includes the following requirements. Ist, that physicians give their practical support to an effort conducted by a medical commission, selected by a Medical Society, which shall endeavor to procure a supply of milk produced under such regulations that purity shall be assured. 2nd. That approved and trustworthy dairymen shall be induced by reason of promised medical support, to conduct their dairies, and to collect and handle the product in conformity with the requirements made by the Milk Commission. The dairyman agrees to observe the conditions of a contract formulated by the Milk Commission. This contract controls the character and location of land and buildings, water supply, drainage, and health of the dairy stock, the cleanliness of the milkers, cooling and bottling of the milk and its care during transportation and delivery. 3rd. The duties of the Milk Commission are to establish correct clinical standards of purity of cow's milk, to be responsible for a periodical and personal inspection of the dairies, to provide for expert examinations of the dairy stock by a competent veterinarian, and for the medical supervision of the employees by competent physicians.

The milk produced shall also be examined chemically and for bacteria under the direction of the commission.

The standards of purity of certified milk are: Ist. An absence of large numbers of micro-organisms, and the entire freedom of the milk from pathogenic varieties.

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*Read before the Hartford Medical Society, Oct. 21, 1907.

2nd. An unvarying resistance of early fermentative changes in the milk.

3rd. A constant nutritive value of known chemical composition.

This in brief comprises the salient points of the contract formulated by the milk commission of the Essex County Medical Association of New Jersey, seventeen years ago, under which all commissions are operating to-day.

The history of certified milk is that of many reform movements—a small beginning, many reverses, but ultimate success. During the first few years progress was exceedingly slow. In 1897 when the milk commission was appointed by the Hartford County Medical Association, there were only two commissions in operation; now there are 27.

In 1890, when Dr. Coit organized his first commission, there was no concerted effort to improve the general milk supply. At that time a committee of physicians showed the direct relationship existing between mortalities and milk, and for two years endeavored to get legislation in New Jersey which would improve the character of milk throughout the State. Little resulted, except to arouse physicians still more to the importance of the subject of pure milk. I wish to emphasize the fact, that the first real improvement in the general milk supply began with the physicians of New Jersey, led by the milk commission, who determined, without waiting for relief through laws, to secure for themselves a clean, safe milk for invalids and infants.

Milk produced under the strict conditions of the contract represents the highest standard obtainable.

The method is in a way unique, and certainly altruistic. No law is required, and no complicated system of inspection is necessary. It does not interfere with the rights of any one. A dairyman is not obliged to sign a contract if he does not wish—it is entirely voluntary. Certified milk does not compete with the general milk supply; it is a special milk for a special purpose.

The plan, evidently fair and reasonable, appealed to physicians outside of Newark, and certified milk became known in other places. The work has steadily grown.

In June, 1907, there was held at Atlantic City a conference of Medical Milk Commissions of the United States. Commissions were represented from all parts of the country. At this conference also were many interested in public hygiene, veterinarians, health officers, representatives from Government Experiment Stations and Agricultural Colleges. The purposes of this conference were to standardize the product, certified milk, to discuss the various problems connected with its production, to determine chemical and bacteriological standards of purity and to perfect a national organization. Great interest was shown in the work.

What is the value of certified milk? In cities the control of the general milk supply must of necessity fall upon the Health Department. The relatively small sale of certified milk cannot in itself change the whole milk supply. The control must be in the nature of official inspection of the farms, dairies, the methods of transportation and the retail stores where milk is sold.

The value of certified milk applies primarily to infant feeding, and in the dietary of the sick. Incidentally it is an object lesson along educational lines.

No one to-day will deny that, other things being equal, the purer the milk the better our results in infant feeding. While a general milk supply may be good, as it is in Hartford, the standard of purity required in infant feeding is higher than that usually obtainable in ordinary market milk.

1st, then, is its purity; 2d, the careful and thorough veterinary control; 3rd, the frequent examinations of certified milk insure a strict regard for the terms of the contract, and the little details of management; 4th, a known chemical composition. Modified milk is more nearly accurate if the proportions of fats and proteids are known instead of surmised. Under education, the second important value of certified milk may be considered, 1st, to the producer, and 2d to the consumer.

One of the functions of the Medical Milk Commission is to prove, by example, that pure milk of good keeping qualities is to be obtained by cleanliness, and a rapid cooling of the milk. This has been shown very conclusively in Rochester, where Dr. Goler, working in conjunction with the city board of health, has conducted a campaign of education at the farms supplying the milk of the city, with the lowering of the mortality rate in little children 50% in the last ten years. In Cincinnati and Louisville the efforts of the milk commission have resulted in a general cleaning up of all dairies and milk shops, and swill feeding of animals, once very common, has been done away with. The efforts of milk commissions and health authorities have been to suggest or compel cleanliness at the barns during milking, a rapid cooling of the milk, clean utensils and bottles and a thorough packing of cans and bottles in ice during transportation and delivery.

Given control at the farm and during transit, the next step is an intelligent care of the milk in the home. To the writer, one of the most important functions of the milk commission is the education of the mother who has charge of the artificially fed infant. It is surprising how little regard is paid to the preservation of milk in many homes. Be a milk ever so pure, the lack of care given it in the average home would make it entirely unfit for infant feeding. Milk is kept uncovered and exposed to heat and flies; in refrigerators together with the general supplies of the home; often on the window sill in the sun.

How shall this education be accomplished? With the agitation for pure milk in New York, about 1893, Mr. Nathan Straus asked the assistance of Dr. Coit and Dr. Freeman to establish a milk laboratory for the distribution of milk to the poor. Later milk dispensaries or infant milk depots were opened in Rochester, Yonkers, Boston, Baltimore, Newark and other cities. These are supported by private funds, fostered and maintained by city boards of health or by milk fund associations. The infant milk depot is the most efficient and economical means known of preserving health or curing sickness among infants in cities. It reduces the mortality and solves the problem in the homes of the poor and ignorant. The Straus depots feed 1,600 infants during the year. Dr. Coit is convinced this plan relieves suffering among the most helpless of creatures while it does not produce pauperism. In Newark the depot connected with the Babies' Hospital feeds about 500 babies annually, with 150 on the daily list. Not all are charity cases; in a large proportion the price of ordinary milk is charged.

Dr. Holt in his report of a study undertaken by a committee appointed by the Rockefeller Institute a few years ago, found the lowest mortality among babies fed from infant milk depots; and this he explains, 1st, because the mother got no more milk than she could use for the day; 2d, the milk was given in the bottles from which the baby was fed; 3d, a proper amount was given at each feeding; and, 4th, the milk was adapted to the individual child's needs.

For the education of the mothers, the New York Association for Improving the Condition of the Poor, with the assistance of a large corps of trained nurses, has been making a canvas of a section of the city, giving mothers actual demonstrations of how to care for milk, to bathe, dress and feed their children, and in case of illness to care for them in their homes or in a summer hospital provided for their use. The Health Department is also engaged in a similar work. It is a suggestive fact that mothers are willing co-operate in this effort for their improvement. It is the experience of the Junior Sea Breeze Hospital that mothers do not have to be persuaded to come for instruction, they come gladly and readily, and most of them learn intelligently.

In Hartford the Milk Commission, co-operating with a committee appointed by this Society, has been working along the lines indicated in this paper. Two farms are producing certified milk, and through the generous interest displayed by the people of Hartford and vicinity a Babies' Summer Hospital has been maintained at Riverside Park for the treatment of sick babies and as an object lesson for mothers. It is the beginning of a plan which it is hoped may be carried on next year to establish a babies' milk depot in connection with the hospital, and to teach mothers how milk should be safe-guarded, the care a baby should receive, to demonstrate beyond contradiction that clean milk, clean babies, and an abundance of fresh air will accomplish results which will secure to the little ones the only chance they have to grow up in health and strength, a benefit to the community, a valuable addition to the assets of the city, a help instead of a hindrance.

Hartford, Conn.

ANESTHETIZING INFANTS AND CHILDREN.

By James Tayloe Gwathmey, M. D.

LECTURER ON ANESTHESIA AT THE NEW YORK POLYCLINIC MEDICAL SCHOOL AND HOSPITAL, ANESTHETIST TO GOUVERNEUR, THE NEW YORK SKIN AND CANCER, AND THE CITY HOSPITALS.

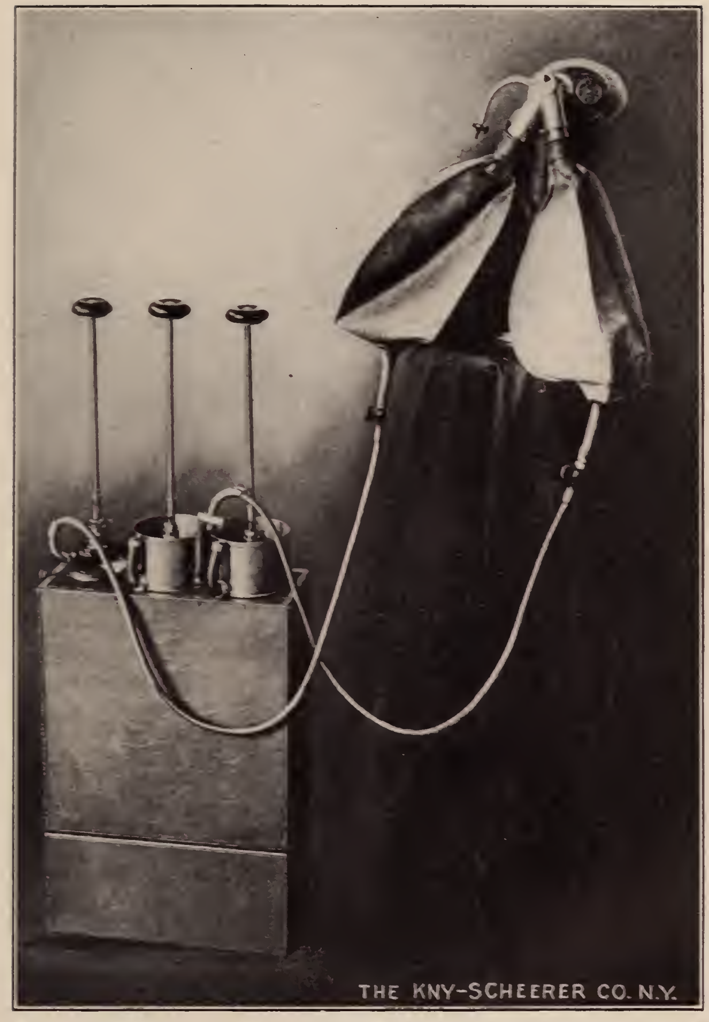
I would like, as a preface to this article, to combat the prevalent erroneous ideas in the profession at large as regards an ideal anesthetic for children.

The first is "Chloroform is the anesthetic best suited for children."

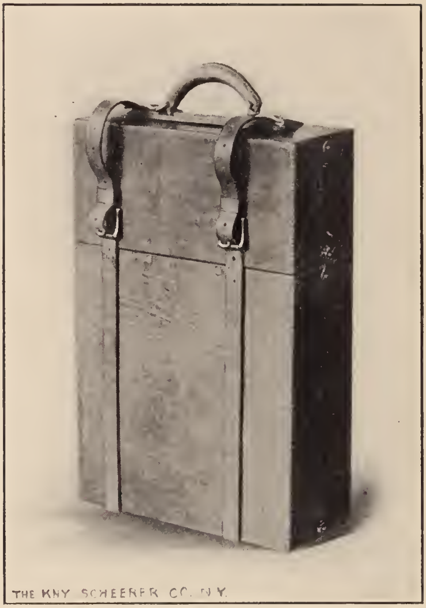
The second is "Children take ether badly."

Within the past few years very great progress has been made in our knowledge of the selection and administration of anesthetics, but in no special class of cases has this progress been as great as with children.

The third erroneous idea is, and this is the most serious mistake of all, that "Children are easy to anesthetize." Chloroform is a protoplasmic poison. It has a cumulative effect. While under two per cent. is not dangerous as regards life, for adults, children can be anesthetized very safely and quickly with as small an amount of chloroform as from 1-10 to 1 per cent. It is rarely necessary to go over 1 per cent. Infants from 1 to 5 years old should be anesthetized with the warmed vapor of chloroform and ether, suitably mixed. In cases of spina bifida, where the little one is only a few days or weeks old, 1-10 per cent. of warm chloroform vapor to induce anesthesia, plus small amounts of warmed ether vapor to continue the anesthetic, is perfectly satisfactory and safe.



To illustrate Dr. Gwathmey's article.



To illustrate Dr. Gwathmey's article.

For the purpose of knowing what per cent. vapor we are giving, the Gwathmey Vapor Inhaler is the most satisfactory for these cases and for children generally. An illustration of this is herewith given. If, however, the anesthetist has not this apparatus, the chloroform bottle should be placed in very hot water when not in use, and the ether can should also be placed in water about 98 degrees Fahrenheit. The mask upon which the chloroform and ether is dropped should have at least ⅛ to ¼ in. thickness of gauze. The reason for this large amount of gauze is that when the anesthetic is dropped upon it the little patient is more apt to get a true vapor than without this protection. If only one or two layers of gauze are used, small particles of ether and chloroform are necessarily inhaled, and consequently the chance of bronchitis or pneumonia is very greatly increased.

The established custom among professional anesthetists in England is to induce anesthesia with chloroform and change to ether, or to give the C. E. mixture (2 parts of chloroform and 3 of ether) for this class of patients. Several deaths have been recorded lately under the heading, "Late After Effects of Chloroform in Children." It will be impossible to have these "Late After Effects" if the above method is adhered to.

For children from 5 to 10 years of age the above method is satisfactory, with the following addition: Let a few drops of the mother's favorite cologne fall upon the mask first of all, and let the child inhale this for from one to two minutes. This accomplishes three things. First, it gives the child the necessary confidence in the anesthetist and places its mind at ease.

Second, the mucous membranes of the respiratory tract are more or less saturated with this cologne and when the chloroform is dropped upon the mask it is almost imperceptible. Having accomplished these two things the third reason follows as a natural sequence, *i.e.*, a more even narcosis can be induced and maintained, than if these preliminary precautions had not been taken. In preference to the C. E. mixture, of which the English anesthetists seem to approve so highly, I prefer the chloroform and ether in separate bottles. As soon as the little patient has reached the third stage, place a few drops of ether upon the mask. If there is no cough or holding of the breath, continue with the ether, but if either of these things occur, continue with the chloroform a few moments longer, and then switch to the ether. It is best then to alternate the ether and chloroform in such a way that we get the benefits of the ether in good pulse, respiration, and color; and the benefits of chloroform in maintaining an even narcosis; without getting the disadvantages of ether in a large amount of saliva, or the disadvantages of chloroform in the ashy color, small pulse and shallow breathing.

In children from ten to fifteen years of age the following method is preferred:

First, a preliminary dose of morphine thirty minutes before the operation, graded from 1-16 to ⅛ of a grain, plus 1-500 to 1-250 of a grain of atropine, according to the age, size, and general development of the patient. The narcosis can then be commenced and continued as outlined above, but warmed nitrous oxide gas and oxygen is far preferable for children of this age.

Nitrous oxide gas is usually contra-indicated in children under ten years of age, although in selected cases it can be given very satisfactorily, either with or without the morphine, as the following two cases will illustrate.

First. Case of Dr. John A. Wyeth. Nov. 4th. Child ten years old. Appendectomy. Operation lasted 18 minutes. Time to induce anesthesia 2 minutes. Child slept peacefully through the whole operation. Slight movement upon first incision. With the completion of the operation the child opened its eyes and seemed to be normal in every respect; pulse, respiration, etc., and suffered no shock whatever from either the anesthetic or the operation. Warmed gas and oxygen used. No morphine.

Second. Case of Dr. Bodine. Nov. 9th. Operation herniotomy. A very poorly nourished child of five years of age. Gas and oxygen used. No morphine. From the application of the mask to surgical anesthesia was five minutes, using at first 9 per cent. oxygen. I found this was a little too much and gradually cut it down to 7 per cent. Patient moved several times during the operation. The last fifteen or twenty minutes entirely satisfactory from both the anesthetic and operative standpoint. The little patient came out of the anesthetic while the bandages were being applied. Suffered neither nausea nor sickness and showed absolutely no shock whatever from either anesthetic or operation. This was a demonstration before a class by Doctor Bodine, which accounts for the length of time consumed in the operation.

The prevalent idea among the profession that a child is easy to narcotize is responsible for an occasional and unnecessary death. The child is easy to anesthetize, provided the anesthetist has had considerable experience with children. The principal danger with this class of patients as with all others is, in the first ten minutes. When the child is crying or struggling and its fears have not been overcome by the methods outlined in this paper, the anesthetist should be very, very careful during the induction period. Instead of using chloroform, he should immediately begin the drop method of ether. It is unnecessary to drop either chloroform or ether upon the mask during expirations. It is most dangerous to continue to drop chloroform during long inspirations. In other words the anesthetist should not allow himself to be hurried either by the child's struggles, the parent's anxiety, or the surgeon's impatience. When chloroform has been used even in as cautious a manner as has been outlined in this paper, the patient should always be held in a horizontal position, with the head inclined downward rather than upward. The anesthetist should always be sure that the air passages are perfectly free. He should also warn the surgeon or his assistant if they should inadvertently place any weight whatever on the body of the child. If the child is asleep when the time for the operation arrives, advantage should be taken of this fact to convert the natural sleep into an artificial one. In fact, an effort should be made, or the operation should be so arranged, if possible, as to coincide with the time for the little one's daily nap. It is as cruel to wake a sleeping child in order to put him to sleep again, as it is to wake a man to tell him that he is going to die. If the child is asleep the cologne should be omitted. Approach the patient quietly. Hold the mask from five to six inches from the face and place one or two drops of chloroform on it. Drop the chloroform very slowly and also let the mask approach the child's face in the same way. If there is hesitancy in breathing, or a cough, or any movement whatever, withdraw the mask. Continue this procedure until there is a slight change in the character of the sleep, usually indicated by hesitation or effort in breathing. When this occurs place the little finger under the chin and draw it slightly forward and up. This relieves immediately the tendency to obstructed breathing. One or two drops of ether on the mask is a better way to find out if the third or surgical stage has been reached than by attempting to lift the eyelid. If no hesitation occurs with the ether, add a few drops more. If the breathing continues calm, we know that surgical anesthesia has been reached.

With this brief, general outline, I will conclude by saying that as with other patients, the anesthetic must be suited to the surgeon and the operation. I will refer, however, to only one special class of surgical cases. The consensus of opinion of throat specialists is, that ether should be used in operating upon adenoids and tonsils. Chloroform can not be relied upon for this operation. For short operations the gas-ether sequence is unquestionably the best. For the radical removal of tonsils, if the child is over ten years of age, give the preliminary dose of morphine as outlined above. Start the anesthetic with the gas-ether sequence and then maintain it with attenuated vapors of ether plus small amounts of chloroform passed through a tube placed either in the mouth or nose. This is decidedly the most satisfactory method for the radical operation. Ethyl chloride should be used as a preliminary to ether when gas is not available.

If the child is in the mother's or nurse's arms, it should be anesthetized in that position instead of tearing it away from this, it's one sheet anchor of confidence, and placing it brutally upon the table, to be held by a strange nurse, or an assistant. Gentleness and tact should be observed here, more than with any other class of patients.

124 East 16th St.

Improved Technic of Lumbar Puncture.—Curschmann (Therapie der Gegenwart, Aug., '07) recommends application of ice to the extremities as a means of promoting the flow of cerebrospinal fluid when it flows sluggishly. He describes a case in which this measure aided the benefits of lumbar puncture, with recovery of the patient, a child with epidemic cerebrospinal meningitis.—Journ. A. M. A.

REPORT OF A CASE OF HEMICHOREA BECOMING GENERAL AND FOLLOWED BY PARALYSIS.

By Le Grand Kerr, M. D.

PROFESSOR OF DISEASES OF CHILDREN, BROOKLYN POSTGRADUATE MEDICAL SCHOOL; VISITING PEDIATRIST TO THE WILLIAMSBURG HOSPITAL; VISITING PEDIATRIST TO THE SWEDISH HOSPITAL IN BROOKLYN.

Clifford H., age three years and eleven days. Male.

Paternal grandfather was drowned at the age of 80 and was always healthy; grandmother died from an illness lasting but a few days at the age of 82.

Father is in excellent health and always has been and has two sisters and one brother who are healthy.

Maternal grandfather died very suddenly and unexpectedly at the age of 73; grandmother died from some complication occurring at her menapause at 47.

Mother is a strong, healthy woman and has one sister and one brother living and healthy, and one sister and one brother dead with Bright's disease.

A step-brother of the patient is 21 and of a very neurotic temperament—another step-brother of 17 being in perfect health and of a phlegmatic type.

A sister of one year of age is a typical picture of healthy infancy.

The patient was breast-fed until one year, at which time he was weaned without difficulty and had a perfectly normal childhood until May 10th, 1907, when he was frightened by the attack of a large dog in the streets. From that time on he would have three to six attacks daily of violent screaming which would be continued for five to ten minutes and without apparent cause, and these attacks were attributed by the parents to temper. On the 16th of May the child became suddenly weakened and had some abdominal pain and in a few hours lapsed into a semi-conscious state which continued until the next day. The stupor cleared up and was followed in a few hours by three distinct attacks of general convulsions.

Then followed a day of apparently perfect health and the child was taken out for play among its companions as usual. On the 19th, there were noticed the occurrence of uncontrollable, irregular movements of one side of the body and the right arm and leg. The face was only occasionally involved. Two days later I was called in to see the child and found quite a typical hemichorea of the right side with a very considerable amount of diminution of movement during sleep. This condition continued until the 25th, upon which day the child had almost continuous general convulsions from 3 p. m. until 11 p. m. After the subsidence of this attack the child's face assumed a wild and hunted expression and the whole of the voluntary musculature became affected with the choreic movements. These became so violent within two days that it was with great difficulty and constant watching that the child was kept from injuring itself. Several of the child's teeth were chipped and broken by the violence of the movements causing sudden closure of the jaws. Until provision was made against such an accident, the child was thrown out of bed by the movements. Sleep was impossible for thirty-one hours and then it came by short spells during which there was a very appreciable diminution in the violence of the movements. Speech was entirely abolished and for three days the child was unable to swallow.

After the first forty-eight hours there occurred a gradual but somewhat rapid improvement which continued until April 8th. On this latter date, there was the onset of a sudden flaccid paralysis involving the right side of the body. There was complete flaccidity and the child remained motionless upon his back. When either the right arm or the right lower limb were elevated and released they fell limply into the position in which they were dropped. The head was strongly inclined toward the left side. I was able to demonstrate to my entire satisfaction that the deep reflexes were not entirely abolished and by careful examination was at times able to detect some slight movements in the musculature of the paralyzed limbs. The cutaneous sensibility was retained as far as could be noted.

The child made no effort to speak and remained in a listless mental state for several days. At times there was a loss of sphincter control but this followed no definite course, for within a few hours after the loss of control, the child would apparently have complete control of both bowel and bladder.

There was no appreciable change in the condition for four days and at the end of that time there were alternate periods of marked improvement and relapse until April 20th, from which time the improvement was both rapid and continued. On August 22, the boy was first able to stand by a chair unassisted and in three days was able to stand alone but the attempt to walk resulted in an immediate fall. On Sept. 2, the child made another attempt to walk and succeeded perfectly although there was a slight tendency to drag the right leg somewhat.

At the present time, November 6th, 1907, the boy is active and with good control of all of his musculature. He is difficult to manage on account of his violent screaming and display of temper when he is displeased.

This case was considered worthy of report because of several unusual features, chief of which was the absence of a neurotic history on either the paternal or maternal side, the apparent influence of a great fright as a cause, the occurrence of a right-sided hemichorea which became general and eventuated into choreic paralysis.

Of course we have had to depend largely upon the mother's statements for the previous history of this boy, but a careful questioning fails to reveal any tendency toward rheumatism, gout or malaria in the families of either parent. Three of the grandparents died suddenly, but at an advanced age, so that the probability of a chronic cardiac cause of their death is small. An examination of the child fails to reveal any evidences of rheumatism and the functional capacity of the heart is normal. There was no evidence of malnutrition, either chronic or acute. Urinalysis was negative at all times, except that the specific gravity was rather high and the phosphates and urates in excess.

The child's present condition of anæmia is a result of the illness and the interference with its proper nutrition over that period—certainly it was not present early in the course of the disease, but is marked even now and that in spite of persistent treatment. If the child is bruised, the wound is slow to heal and quick to suppurate and if this state and the anæmia had been present before the attack we would have considered it as a possible cause or predisposing factor, but such was not the case.

A most diligent search has been made for a probable cause existing previously to the fright, but in this we have been unsuccessful.

Catalepsy in Young Children.—Hecker (Centralb. f. Kinderheilk., Jahrg. xii, S. 1), after a short description of the phenomena in catalepsy, mentions its rareness in young children. The only cases on record were published by one author, Epstein, eleven years ago. Hecker relates the case of a boy, 3½ years, who was well till a year ago, when he suffered from measles and broncho-pneumonia. Since then he had been chronically ill with recurrent attacks of diarrhœa. There were no abdominal signs beyond slight tympanites. The child cried when examined, but otherwise lay motionless and without interest in his surroundings. He looked stupid, but obeyed simple commands. Spasmus nutans was present, without, however, nystagmus. Typical cataleptic manifestations occurred when the child was handled, but not spontaneously. Hecker, in discussing the pathology of the condition, points out its purely psychical nature, it being definitely a manifestation of hysteria. He rightly considers that the gastro-intestinal disturbance, which disappeared on admission to hospital, was not concerned in the production of the catalepsy.—Brit. Journ. Chil. Dis., Oct., '07.

SENSORY SYMPTOMS IN THE ACUTE STAGES OF ANTERIOR POLIOMYELITIS.

By William Browning, M. D.

PROF. OF NEUROLOGY AT THE LONG ISLAND COLL. HOSPITAL, BROOKLYN, N. Y.

This disease of the cord is usually regarded as purely motor in type. And as regards the later chronic condition this view is largely correct.

But, during its onset, its development and often during the supervening subacute stage, sensory manifestations are common. These may be grouped under three heads, gross sensory impairment, paræsthesias, and pain. Before considering these in sequence, it may be premised that as these patients are usually young children and moreover in an unnatural febrile state, it is not such an easy matter to make sure about their sensations.

What is here said is based not only on the recent epidemic cases but on the previous sporadic ones such as occur at all times. While it may not be quite certain that the two classes are identical, they are sufficiently so for present purposes.

I. Gross Sensory Disturbance.—By this, is here meant an impairment or suspension of all forms of sensation from the affected portion of the body. Of this little if anything appears to be known, and even where the occurrence is real, its duration is but transitory.

In illustration I will only cite briefly one recent case, that of a boy of four years seen with Dr. J. B. Zabriskie. The day when motor paralysis of one leg became pronounced and unmistakable (about a day and a half after the onset of any symptoms), it was noted by the Doctor that no evidence of sensation could be made out in that part by touching, pricking or any even gross tests. Otherwise he was fussy and sensitive enough, even the other leg responding well to tests. By the following day sensation had fully returned in all parts.

It would seem quite possible that inflammatory swelling (hyperæmia, infiltration, &c.) of the anterior gray matter, might by crowding and pressure cut off for the time the transit of sense impulses in the more posterior sensory tracts. Of course as these paths are not directly involved and the turgescence soon begins to sibside, the interference would be but transitory. Neither is it to be expected that this special anæsthesia will occur in more than a proportion of cases, more in those where the inflammation is concentrated at one level. This makes its interpretation analogous in principle to that of the transient anæsthesias observed in ordinary cerebral hemorrhage.

In only a few cases do we have the favorable opportunity to make early and definite examinations on this point. I recommend it as a matter worth observation when the chance offers.

II. Paræsthesias. Some of these, such as stiffness and heaviness, may express real mechanical facts. In a few cases, however, there are other complaints of a mild nature. Numbness and peculiar sensations of that type are in these mentioned as occurring in the part that is becoming or is about to be affected. These are unimportant and it is hardly necessary to indicate any explanation.

III. Pain. By far the most important effects on the sense side in this disease are the various forms of pain. And we can distinguish here a difference in the time and character of the occurrence of these forms. They are mostly in the invading and acute stages, while one special form belongs entirely to the subacute.

The accompanying headache appears to correspond to that of the invasion stage of most acute infections.

Part of the early pain can be classed as an hyperalgesia such as is common in inflammatory and irritative conditions of the central nervous system, *e.g.* in meningitis. Here the distribution is peripheral, sensitive soles or skin elsewhere, pain at the shoulder or in the popliteal space, and various discomforts here and there without very close reference to paralyzed parts. Not rarely, even when the force of the attack is extended on lower portions of the cord, pain is complained of at the back of the neck. These can be put down as variously due to hyperæsthesia, local hypertonia, etc. It is hardly warrantable to speak of a neuritis as the trouble subsides so soon.

Next we come to what appears to be a purely spinal pain. It is in some few cases extremely severe, persisting for one or more weeks, in other patients it is entirely absent, while in many it lies between these two extremes. From its character it appears to depend on the extent to which the spinal meninges are implicated in the process. If the lesion be limited strictly to the spinal gray matter and not extensive, there is nothing to occasion this pain. But if the inflammation be severe at any one level, there may well be some co-ordinate involvement of the membranes, and with this the severe pain usually attendant thereon. This may even be spontaneous, but it is greatly increased by any movements of the spinal column.

In many of these cases, during all of the acute stage, a distinct tenderness exists along the spinal column, corresponding to the site of the inflammation, this may even be one-sided, and is apt to persist through the subacute stage. That congestion about the spinal bones might easily be associated with poliomyelitis is evident from the vessels that accompany each spinal nerve, connecting the vertebral with the myelic.

It is this spinal pain that appears to be so favorably influenced by local counter-irritation.

There is another little-recognized type of pain, unlike the preceding in character, and distinctly later in appearance. This is the soreness and tenderness that comes on after the acute stage has passed, and is wholly peripheral in site. It is principally in the affected muscles (myositis). These become tender, and the corresponding nerve-trunks may also participate. There is not so much spontaneous suffering from this, as painfulness on motion and manipulation. It is most readily elicited by pressure on the respective muscles. It is clearly due to the secondary degeneration that follows in consequence of the damage to the anterior gray horns of the cord. We know that experimentally after nerve-section it takes two days to a week for the muscular degeneration to become evident. It then persists for an indefinite time, in light cases for a week more or less, and in severe ones as long as a month.

It has a prognostic value. For, as soon as it can be mapped out we are able to distinguish more exactly in these young subjects than by electrical or other means the extent of the muscular involvement.

NEW YORK ACADEMY OF MEDICINE.

Section on Pediatrics.

Stated Meeting, Held November 14, 1907.

Dr. Godfrey R. Pisek in the Chair.

A Case of Thyroid Implantation in a Child.—Dr. Louis Fischer presented this case, a child of two years, first seen by him Dec. 8, 1902. She neither walked nor talked and her tongue protruded constantly. The lips, eye-lids, and skin of the face were rough, course and thickened, with a jaundiced appearance. There was a marked depression on either side of the temporal bone and a frontal protuberance. The first tooth appeared at the age of sixteen months, one month after thyroid treatment had been begun. When twenty-two months old the child had nine teeth. There was no evidence of rickets, but the internal secretions were very torpid. The child had a great fear of water and constipation was very obstinate. The thyroid gland was not palpable. The pulse was 90 and the temperature sub-normal. When crying respiration was 24 and when quiet 16. Beginning with one grain of thyroid three times a day, the dose was increased until at the end of a week the child took two and one-half grains three times daily. With attention to diet in addition to this treatment the child developed rapidly, the teeth appeared at regular intervals and the bowels became regular. In one month she grew three and one-eighth (3⅛) inches and in a year 13½ inches. In 1906 she had measles and the rash remained in evidence for two months. About once a year her hair fell out and the skin peeled from her palms and soles. She had constant tremor and sometimes had laughing spells which lasted all day. The mother thought the child masturbated. She was very poorly developed mentally. On May 8, 1907, Dr. Lilienthal operated on her, transplanting the thyroid through an abdominal incision. Normal conditions prevailed during the first month after operation. Fever then developed, the child becoming emaciated and a diagnosis of pyelitis was made. At the end of two months she returned to her home very much improved and taking five grains of thyroid three times a day. Horsley had made implantations of thyroid glands from animals to man by using sheep's thyroid. In 1883 human thyroids were used by Kocher and others, but the results as a whole were no better with the homothyroids than with the heterothyroids.

REPORT OF A CASE OF CONGENITAL GOITRE IN A CHILD, WITH OPERATION.—Dr. Edward Wadsworth Peterson reported the case of a child five weeks' old when admitted to the hospital, having no history of tuberculosis, syphilis, cancer or goitre. The mother had had one miscarriage at the second month. This was the first child and labor was easy and uneventful, the child being normal, except for the swelling at the right side of the neck. There was difficulty in breathing for a short time after birth but this had subsided and up to the time of admission to the hospital there was no dyspnoea or dysphagia. The enlargement was anterior to the sterno-cleidomastoid muscle, just below the lobe of the ear, filling the submaxillary space and extending nearly to the clavicle. The tumor was moderately firm and did not fluctuate at any point. At operation the tumor was dissected out without difficulty. Work had to be suspended several times during the operation because the child ceased to breathe. Artificial respiration was used occasionally for twelve hours after the operation. There was nothing unusual until the ninth day when the child had a convulsion lasting about five minutes. On the thirteenth day there was twitching of the arms and legs and the eyes rolled from side to side. On the fourteenth day there were constant convulsive movements and rolling of the eyes. The tumor was found upon examination to be congenital goitre. The unusual feature was the abnormal location of the thyroid gland which led to the accidental thyroidectomy, and the development of tetany on the ninth day which continued until thyroid extract was administered.

Dr. Schwarz inquired whether the tumor had been examined for parathyroids and if the child was still taking thyroids.

Dr. Peterson replied that in removing the tumor the capsule had been split and the gland enucleated, but the parathyroids were not removed. The child was still taking thyroid extract. He did not know how to account for the tetany.

PROTEID INCAPACITY IN INFANTS AND CHILDREN.—Dr. Henry Dwight Chapin said that the belief that proteid was a substance for which infants had a greater or lesser capacity and that the problem of feeding could be solved by the mere increase or decrease of the percentage of proteid in the milk mixture has been found to be erroneous and it was doubtful if it had ever been rigidly applied in practice even by its most ardent advocates. An infant could not be said to have proteid incapacity merely because it does not tolerate whole or diluted cow's milk, for often as soon as this form of proteid is modified the infant begins to thrive.

This condition would be more properly termed proteid idiosyncracy and the term proteid incapacity only applied to those cases where no form of proteid is long tolerated. It is a cardinal principle of biology that no two plants or animals are exactly alike and it is as well to recognize that wide differences exist in perfectly normal infants. Some animals consume twice as much food as others to produce the same amount of flesh. The same is true of cows in regard to the production of milk and butter. It is not a safe conclusion that because a certain percentage of proteids produces a satisfactory result in many infants of a certain age, that this percentage can always be accepted as a safe standard. Other infants may not be able to assimilate more than one-half of the proteids although they may digest them well. Thus we may meet cases of good proteid digestion but poor proteid assimilation and also cases where the opposite condition exists. Proteid does not always mean a simple substance as does fat or hydrocarbon, as for instance white of egg and milk albumin of whey, while proteid could not be used as the sole supply of proteid. Some forms of proteid are combined with iron and phosphorus, and possibly this deficiency may be the cause of some of the poor results in infant feeding and may account for the good results sometimes noticed in feeding milk modified with gruel made of oat or legume flour. He did not advocate freak or random feeding and too much of the so-called scientific feeding had these failings.

The object in infant feeding is to produce a well rounded child that shall have normal tissues and properly developed digestive organs. If the amount of cow's milk sufficient to nourish it properly cannot be digested, continuing the infant on a low percentage will result in anæmia or rachitis. There are available for the purposes of nutrition many forms of proteid other than milk proteid, but they do not have the property of solidifying in the stomach and consequently cannot be used alone for any length of time. but by combining such proteids with milk the nutritive value of the food can be kept up and the disturbing element of cow's milk reduced with safety. The cereals and legumes furnish such forms of proteid, which are used for cell formation in embryonic plants.

The strong tendency of all living beings to adapt themselves to their surroundings and their food is a fact well established. By gradually changing the form of the food the feeding habits of almost any species can be changed to a remarkable degree, so in adapting the various forms of proteids to the needs of infants and training infants to use them, a perfectly natural process is being employed and the one by which nature determines whether or not an individual or a species is to live. The more that is learned about the composition and properties of the milk of various animals, the wider apart human milk and modified cow's milk appear. Until much more is learned the only safe plan is to follow the broad laws of nature; that is, present to the infant food materials known to contain good tissue builders in as nearly as possible the physical condition assumed by mother's milk in the stomach and leave it to the infant's power of adapting itself to new conditions to get the good out of the food. If this is done there will not be so many rachitic or anæmic children, so many difficult feeding cases, or so many instances of proteid incapacity, for the infants will get proper food early when their power of assimilation is greatest, and by having a good start will be able to keep in good condition. The class of cases which show actual proteid incapacity is made up of those who are permanently physically unfitted and those who may be only temporarily unfitted for digesting proteids. Those in the first-class will die. Many of those in the second class can be saved by mother's milk or by the use of very light fluid diet that remains fluid or soft in the stomach until digestion becomes stronger. In some of these cases the use of a vegetable proteid rich in iron (oat or legume), which is termed mixed proteid feeding, may cause a general upbuilding and improved digestion may follow. Whenever there is difficulty with proteids in a fairly well nourished child mixed proteid feeding, using a high proteid gruel with the milk should be tried. The object of this paper was not to go into details but to call attention to the underlying principles involved in the management of cases of proteid incapacity and idiosyncracy.

Carbohydrate Incapacity in Infants and Young Children.—Dr. C. G. Kerley discussed only the soluble carbohydrates commonly used, cane sugar, milk sugar, maltose, and the insoluble carbohydrate starch. The most usual manifestation of sugar excess is regurgitation between feedings. Cane sugar is most apt to produce this, though maltose might produce it in a lesser degree. The capacity for milk sugar is greater than for either of the other forms and could be given in larger amounts. In vomiting children sugar should be reduced as the first step in the treatment for the reason that fat is the more valuable nutritional factor. Both sugar and fat capacity might be increased by the use of considerable quantities of lime water. Milk-sugar may produce glycosuria, if used in excess, but rarely if used in the usual amounts, four or five per cent. maltose incapacity is evidenced by regurgitation, vomiting and its laxative properties. It is useful in supplying carbohydrate to the constipated bottle-fed. The usual systemic manifestations of sugar incapacity are irritability, scalding urine and eczema.

There is no age limit for cooked starch feeding. Among sixty infants in whom examinations were carried out at length, 41 showed good starch digestion and nineteen an indifferent or poor starch digestion. Among those showing a good starch capacity eleven were under six months of age. Abdominal distension is a very inaccurate sign of starch indigestion. The iodine test is the only means of determining what has happened to the starch ingested. It was his experience that if starch was not digested it did very little harm.

The chief harm that arose from starch feeding was constipation which sometimes followed its use. This might be prevented by the use of some dextrinizing agent. It was rarely wise to use starch in stronger mixtures than three per cent. in children under one year of age. In older children as in infants starch incapacity is frequently the cause of constipation. This could be successfully relieved by reducing the amount of starch taken, removing bread, dry or toasted, crackers, zwieback and biscuits of different forms from the diet and in the use of taka diastase gr. iiss tablet one-half hour after meals. The cane sugar capacity of older children varies greatly, some taking from four to eight ounces daily without inconvenience and others being affected by a few grains. The most usual manifestation of sugar poisoning is a persistent hyperæmia of the mucous membrane of the upper respiratory tract. Recurrent rhinitis, tonsillitis and bronchitis are seen most frequently in sugar susceptibles; children who have eczema, frequent urticaria, rheumatism and recurrent vomiting have a poor sugar capacity. The administration of sugar to children having a mixed diet is unnecessary to the organism. The organism is able to convert all the sugar necessary from the starch taken in the average mixed diet. He was of the opinion that the consumption of large quantities of sugar by the growing portion of our population was one of the great dietetic errors of our day.

Fat Incapacity in Infants and Children.—Dr. John Howland said that the radical belief that fat is decidedly the most frequent disturbing element in infant feeding is rapidly gaining ground. The limit to fat capacity could not be expressed in percentages, and varied with each individual child. The capacity which normal healthy infants possessed for fat is not shared by the premature and feeble. During any illness, especially a febrile one, the capacity for fat digestion may be almost entirely suspended and for a long time after an acute inflammation of the gastro-intestinal tract. The symptoms of fat incapacity may be divided into gastric, intestinal and constitutional, though they are usually associated. The gastric cases are distinguished chiefly by vomiting. The material vomited is usually strongly acid and has the unpleasant odor of butric acid. The vomiting may be of all grades of severity. It had been shown that fats of all kinds, including cream, caused no excitation to the flow of gastric juice, but that when mixed with proteid food it had a direct inhibitory effect upon the secretion of gastric juice, which was greatly delayed in its appearance and much diminished in quantity. The food is retained an undue length of time in the stomach without gastric juice sufficiently strong to protect it from fermentation. The stools in the mildest instances contain white masses of larger or smaller size. These are in the majority of instances, soaps of fatty acids and not curds as so frequently supposed. In more marked instances, especially in older infants, constipation is present and most characteristic. The stools are generally large, dry, grey or whitish in color, foul in odor and alkaline in reaction. Chemical examination shows them to be made up almost entirely of insoluble soaps of the fatty acids. The foulness results from the delayed stay in the intestines. The saponification of these fatty acids demands alkalies and these are lost to the organism. In younger infants a diarrhœa sometimes deyelops with large green acid stools. Some children fed upon an excess of fat may without evidence of much gastro-intestinal irritation, have high fever, which may be accompanied by convulsions, prolonged and persistent, and showing a great tendency to recur. There may be nervous symptoms as tetany and laryngisimus stridulus. In other cases there is pallor, languor or malaise and a loss of muscular tone, though the child may be exceptionally fat. If these danger signals are not heeded loss of weight begins and may continue until the condition becomes one of extreme inanition. Keller has proved that an increase in the fat of the food beyond certain limits caused a great increase in the ammonia nitrogen in the urine. This meant a constant loss of fixed alkali which is necessary for the performance of normal processes in the body. The result of a withdrawal of alkalies is acid intoxication.

Dr. John Lovett Morse of Boston, Mass., feared that Dr. Howland's paper might create a false impression on those not familiar with infant feeding and that the attempt to fill in the proper amount of fat might do harm. Babies could be fed for years on 3 or 4 per cent. fat, but they did not do well on milk that ran 6, 8, 10 or 12 per cent. fat. He thought this point should be emphasized.

Dr. Roland G. Freeman thought the proteid gave trouble oftener than any other element, the curds interfering with proteid digestion for when one made the proteids more digestible the curds diminished. The curds were markedly affected by pepsin, while the peptones had no effect whatever. He thought it well to emphasize the fact that the class of infants with proteid indigestion who would necessarily die was a very small one. Almost all babies when given proteid in proper form and otherwise properly fed would thrive. It was a rare thing for a baby with proteid indigestion to succumb to this trouble. A cereal decoction was most valuable when the proteid was not well digested and whey mixtures or peptonized wheys could also be used. He thought the sugars rarely caused trouble if the lactose was in proper amounts. In a series of experiments he had found that a large proportion of children did as well on cane sugar as on milk sugar. He thought delicate children would do better if the fat percentage was no higher than the proteid.

Dr. E. H. Bartley took exception to the statement that putty-like stools were always composed of either fatty acids or soaps; in case of alkaline stools, ammonia soaps. He had examined many stools and found fatty acids easily dissolved by ether soaps. Many passed stools composed of fatty material which indicated proteid indigestion rather than fatty indigestion. The two forms of indigestion seemed to go together. In difficult fat digestion one was likely to have an excessive amount of ammonia, therefore the alkaline stools were not from soaps or fats, but from proteids. An alkaline reaction came from one of two sources, either an excessive amount of serum in the intestines, or the administration of an alkali. Alkaline fermentation might be a possible source. Thus it often happened that proteid fermentation went on with fat indigestion. The alkaline reaction of stools should be emphasized. There were many stools that were acid in reaction in the presence of fat indigestion; an alkaline stool was rather the exception than the rule. He had spent much time studying the effects of sugar, and could produce a headache in himself by eating invert sugar; that is, sugar cooked with acid salts. Rock candy or crystallized sugar did not produce that effect. Glucose would also do it. Maltose and lactose did not produce it to any extent. Where there was sugar incapacity the invert sugars seemed to have a worse effect than cane sugar. The effects of the excessive use of sugar in children came from ten to twelve hours after eating. The way in which foods were manipulated made a difference in considering the question of incapacity or relative incapacity. Men equally successful in infant feeding arrived at good results in different ways. All agreed with Dr. Kerley in regard to the excessive use of sugars. He believed that the further study of stools would give better ideas of the difficulties in infant feeding than we now had from the study of symptoms alone. In regard to the curd, he said that when examined microscopically it seemed to consist of fatty acids and soap, but they were not formed in that way. If fat was subjected to the action of rennet the fat was enclosed in its meshes and there was both proteid and fat. As the mass passed through the intestine there was a great deal of proteid decomposition. There was an immense quantity of bacteria and they had destroyed the proteid framework of the mass.

Dr. Louis Fischer emphasized the fact that in studying the capacity of a given infant we should consider whether we were dealing with a normal infant or were feeding a sick infant with abnormal digestive powers. A healthy infant might assimilate two per cent. or more of fat during its first month without gastric disturbance, while a dyspeptic infant might have gastric disturbance of less than two per cent. of fat. The same applied to the digestion of proteids. Proteid indigestion might result from feeding one per cent. proteid and might continue until the caseinogen was cut down to 0.25. In such cases one might feed nothing but whey proteid. The new-born infant would tolerate almost any formula of fat, sugar and proteid for a number of weeks, because its stomach was healthy.

The tendency to-day was to overfeeding and this was not limited to fats and proteids, but applied especially to carbohydrates. If proteid or fat incapacity caused severe gastric disturbances, such as vomiting, colic, or lumpy stools, then the temporary substitution of whey, with or without condensed milk was useful. He had seen cases of pyloric spasm where the constant vomiting was due to high fat. In some cases the breast-milk was examined and found to contain five per cent. fat. This was pumped off and diluted with two parts of water when the food was tolerated. In cases where, in addition to dyspeptic symptoms, the infant showed atrophic symptoms and emaciation all modifications of cow's milk should be stopped and nothing but human milk substituted, as nothing else would prolong life and develop the infant.

Dr. Herman Schwarz stated that some German authorities claimed that the difficulty with cow's milk was the casein and that this in turn was due to the high fat percentage. Czerny had made the statement that there was no such thing as casein indigestion and that there was no doubt but that infants could digest starch. He did not think one could determine the child's capacity for starch by testing the stools with iodine. There was no doubt in his mind but that high fat percentages were very injurious.

Dr. Henry Dwight Chapin said that he did not mean to convey the idea that proteid incapacity was at all common, but he wished to make the distinction between incapacity and idiosyncracy.

By changing the proteid often it could be kept down to the right point. Fresh air and hygienic surroundings contributed to proteid capacity. He was also opposed to high fat percentages. There were different kinds of top milks. Top milk feeding was, however, the best method of giving the baby the proper amount of fat.

Dr. Charles G. Kerley said that cane sugar was digestible and took the place of lump sugar, but one could not give it in equal quantities. A great deal of starch was utilized for nutriment even by the youngest children.

Dr. John Howland said he had purposely kept off of percentages and had tried to point to clinical symptoms and to explain them. The amount of fat should be between 3½ and 5½ per cent. The limit of fat that a child could take was very variable. He did not mean that skim milk mixtures should be used.

SOCIETY PROCEEDINGS.

A Joint Meeting of the Brooklyn Society for Neurology, and the Pediatric Section of the Kings County Medical Society.

A joint meeting of the Brooklyn Society for Neurology and the Pediatric Section of the Kings County Medical Society was held on October 30, for the object of providing an opportunity for a comprehensive presentation and discussion of acute anterior poliomyelitis.

In a paper on the "Etiology of Acute Anterior Poliomyelitis" Dr. Bernhard Fedde called attention to the number of cases in which gastro-intestinal symptoms were the first to appear, and asked whether it were not reasonable to infer from this, that the causative agent entered the body by way of the digestive tract.

Dr. Hyman Climenko presented the next paper, entitled "Clinical Studies." This speaker also emphasized the frequent occurrence (43 per cent.) of gastro-intestinal symptoms during the stage of invasion. He thought that those investigating the disease might well turn their attention from the cerebrospinal fluid and the blood, which have so uniformly yielded negative results, to the gastro-intestinal tract. An analysis of his own cases proved that females are slightly more liable to attack than males, in the proportion of 174 to 113, and that most of the cases occur between the ages of two and four years. A review of the literature demonstrated that most of the previous epidemics had been reported from countries of temperate climate; only one having been reported from Italy, and one from Spain.

In "Previous History and Environment," a study of the recent epidemic at Ridgeway, Pennsylvania, Dr. J. F. Terriberry showed that the disease first appeared in a mining village some distance upstream from Ridgeway, and one week later, in a small town on the same stream, below Ridgeway; so that the disease appeared to travel down the stream. This paper began with a review of the literature, in which it was shown that 15 epidemics in all had been recorded since the report of the first one in 1843. All these epidemics occurred during the late summer or early autumn months, frequently after a hot dry summer, and always in low-lying districts—often in long, narrow valleys where there was little sunlight. No connection could be traced between an epidemic and the food or water supply.

"Onset and Acute Stage" was the title of a paper by Dr. Louis C. Ager, in which the author called attention to the frequency with which gastro-intestinal disturbances were met with as invasive symptoms. Of these, vomiting and diarrhœa were the most frequent, although constipation might occur, as marked and as obstinate as in cerebro-spinal meningitis. In some of the cases, improvement was said to occur, between the gastro-intestinal symptoms and the onset of paralysis. Pain and tenderness, it was thought, were very frequent in cases at all severe, and a point that would be of service in distinguishing this affection from a neuritis, was, that the tenderness here is in the muscles themselves, rather than in the nerves.

A contribution by Dr. A. C. Brush on "The Chronic Stage" completed the consideration of the symptomatology.

The question of treatment was opened by Dr. L. Pierce Clark, with a paper on "The Acute Stage." The treatment in the acute stage comprised active purgation and rest—preferably on the side, so that the spine should not be the most dependent part of the body. If the process were extending rapidly, the prone position was to be preferred. Warmth applied over the spine was thought to be of some benefit.

After treatment was discussed in two papers: "Orthopedic," by Dr. J. M. Clayland, and "Neurological," by Dr. Frederick Tilney. Dr. Clayland gave five causes for the deformities which follow anterior poliomyelitis: gravity, contractures, transmitted body weight, unequal growth of bone, fasciæ, and skin (the chief cause), and subluxations (which are usually painless and often unrecognized). Deformity was to be prevented by massage and passive motion, or by the application of braces. It might be cured by braces, or by tendon transplantation. Regarding the treatment of lower limb paralysis, it was said that building up the sole of the shoe on the proper side would often obviate the use of a brace. The brace treatment of the various muscle groups was then described in detail, and finally the operative treatment was considered. This might be hourly manipulation by the mother or nurse, or in the more severe cases by the physician himself, or, perhaps, an over correction of the deformity, with the limb subsequently held in this position by the application of plaster. Nerve transplantation was thought to be useless after paralysis had lasted for more than a year, but done after four or six months, the results seemed to be promising.

Dr. Tilney, from the neurological aspect, advised the commencement of massage as soon as possible after the febrile stage. This massage should be deep, the endeavor being made to strip the blood and lymph from the muscle. To induce muscular contractions, the slowly interrupted galvanic, and the low pressure Faradic currents, were thought by this speaker to be of distinct value. Special emphasis was laid on the importance of exercise, and regret expressed that by reason of their extreme youth, these little patients were unable to appreciate the value of this part of the treatment. The toe-drop was to be treated by means of plaster casts, with a window over the anterior tibial region for massage, and the application of the electrode.

DISCUSSION.

Dr. Smith Ely Jelliffe was of the opinion that many cases might be made into mild cases by prompt early treatment: i.e., elimination. Particularly to be recommended for this purpose were hot baths, of a temperature between 102 and 105 degrees F., and a duration of from fifteen minutes to one hour. Counter irritation was thought to be important. Antipyretics and analgesics were frequenly indicated: antipyrine, chloral, or codeine. Distinct improvement was often seen after lumbar puncture, although it had not been demonstrated that there is any increased tension in the cerebrospinal axis. The speaker was sure that nerve transplantation might be of value after years of paralysis. Swimming movements in a deep tub of water at 105 degrees F., were suggested as a very efficient method of exercising the limbs.

Dr. Bartley thought that the disease was, in all probability, a toxæmia, originating in the gastro-intestinal tract.

Dr. Truslow emphasized the necessity of carefully studying the situation, before attempting to correct the deformity with braces. No massage or electricity should be given while there is any irritation present.

Dr. Snow said that he had directed his attention to the central lesion. He thought that the electric current should not be used during the febrile stage. Concerning the application of heat, it seemed to him that by applying dry heat, a more active diaphoresis could be obtained; for in this way it was possible to utilize as high a degree of heat as 300 degrees F. He had been using lately a static wave current, with a long spark gap. No system of massage gave such good results, he thought, as did the violent vibrations induced by this method of using the electric current.

Dr. Loughran mentioned some excellent results that had been obtained by the use of Bier's method of producing artificial hyperæmia in the affected limb. No apparent atrophy resulted after thre months' treatment.

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EDITORIAL

GOAT'S MILK FOR INFANT FEEDING.

The rapid increase of tuberculosis in infants, or rather that this condition is now the more often diagnosed, reminds us that Professor Behring insists that "all tuberculosis originates from milk feeding in children." He has not hesitated to declare that even the phthisis of young adults "is only the last verse of the song that was sung to them in their milk-feeding days as infants." Be this as it may, we all realize the fact that notwithstanding the great improvement in the character of the milk supplied to us, tuberculosis among cattle has not been wholly eradicated. But recently the herd of cows supplying milk for one of the largest infant institutions in New York City, was found to contain many tuberculous cows.

In view of this, as well as of the increased cost of furnishing clean milk, the United States Department of Agriculture has been led to investigate the goat as a source of milk supply for children.

The goat in this country is practically free from tuberculosis, which would make its milk of great value as a food to all children, but especially to those infants of tuberculous parents, not yet infected.

A goat will produce nearly 1,000 lbs. of milk a year of a food value much greater than that of cow's milk.

Its composition is: Fat, 4.30% ; Sugar, 4.00% ; Proteids, 4.70% ; Mineral Matter, 0.60% ; Total Solids, 13.50%.

It is claimed that by proper feeding the curd of goat's milk may be rendered less solid than that of cow's milk, and the amount of fat and proteids easily diminished.

The goat has been used for hundreds of years in the older countries as a source of milk supply and the government feels that with knowledge will come an increase in its use.

ABSTRACTS

Nephritis in Infants.—DR. GEORGE CARPENTER (The British Journal of Children's Diseases, Oct., 1907, No. 10, Vol. IV) contributes a very interesting and valuable article on this subject.

A striking feature is the great frequency of albuminuria following disorders of the gastro-intestinal tract (75 out of 86 cases as quoted from H. Dwight Chapin's statistics), pulmonary diseases (49 out of 57 cases), cerebro-spinal menigitis (9 out of 11 cases), and other general disease (31 out of 45 cases).

Chapin believes that irritation and congestion of the renal tubules result from almost all disturbances of the body functions of infants. He, however, attaches very little importance to its presence.

Dropsy in infants occurs usually either soon after birth or during the first year or so: the period of greatest frequency of gastric and intestinal disorders. The œdema varies in degree and is similar to that met with in nephritis. Hutniel thinks the retention of the chloride is the important cause of the dropsy, and Heubner experimentally confirmed his opinion. The improvement in this œdema according to Potter is brought about by increasing the proteids in the milk. He disregards the diarrhœa.

The question has arisen as to whether renal insufficiency is not caused by a pathological condition of the kidneys and whether such may not be the case even without the presence of albumin. This is without doubt very frequently the case as it has often been proved that renal diseases may exist without the presence of albumin casts or renal elements, in the urine.

It must be stated, therefore, that although œdema may denote nephritis without the presence of albumin and casts, renal disease may not be present if albumin is found. If albumin and casts are absent it is not likely the kidneys are diseased even if the œdema be very extensive.

Many diseases are given as the causative factors of œdema in the new form, i.e., a failing heart, atelectasis and engorgement of the venous system, etc., as well as nephritis. In older infants tuberculosis, pulmonary disease, leukæmia and pseudoleukæmia in addition to nephritis are mentioned.

The important rôle of syphilis as an etiological factor in nephritis in many cases has been recognized.

The frequency with which nephritis in the very young has been overlooked is attributed to the difficulty in collecting the urine as well as to the fact that even very extensive renal disease may not be accompanied by dropsy. At autopsy also it is not infrequently unobserved because of the peculiarity that nephritis of infants whether of syphilitic or of simple origin does not appear pathological on gross examination. It is necessary in very many cases to make an extended search with the microscope before the diseased condition is found.

D. Clifford Martin.

Scarlatina and Duke's Disease.—A. C. Cotton (Journ. A. M. A., Oct. 26, '07) says that the struggle for recognition of the different exanthems has been a long one, between variola and varicella, morbilli and scarlatina and many years passed before röheln was diagnosed as a distinct disease.

The author holds that Duke's disease is differentiated from scarlet fever by "1. Long period of incubation; 2, absence of initial vomiting; 3, moderate fever of brief duration; 4, normal ratio of pulse to temperature; 5, absence of characteristic scarlatinal tongue; 6, the absence of, or if present, the fine character of, desquamation; 7, the freedom of sequelæ; 8, probably the absence of leucocytoses. When one or more cases of apparent mild scarlet fever occur in a family giving a clean history of former attacks of scarlet fever, Duke's disease may be suspected."

The disease is less contagious than measles, about like scarlet fever, has a period of transmissibility of from two to three weeks. Incubation from one to three weeks, little or no prodromata, first symptom often being the rash itself, but a slight fever may be present four to six hours before the eruption, which first appears on the face, rarely on the neck, and then spreads downwards to the lower limbs in a few hours. "Occasionally fine points first appear which quickly blend in a general hyperæmia, with rarely small patches of normal skin sharply defined by irregular margins. Its color resembles scarlet fever and fades rapidly, often two or three days without stain. The desquamation is not the characteristic "peeling" of scarlatina, but more like measles, being fine and branny. The tongue may sometimes be coated. There is no marked involvement of the glands.

Broadbent, Ashley, Kidd, Romer, J. J. Weaver, Simpson, Curtis, Brokay, Klein, Ruhemann, Chemisse, Unruh, Illoway have seen these cases as first described by Duke in The Lancet (July 14, 1900). While Poynton, Millard, Williams, Washburn, Marsden, Ker, Rutter and Griffith believe it to be "atypical, abortive, sine eruptionè, sine febre, sine anginose, recurrent and mild as referring to scarlatina and measles, while scarlatinal and moribilliform as applied to rubella."

A. J.

Relapsing Herpes of the Face in Children.—The American Journal of Dermatology (Nov., 1907) says that too little consideration is given in the literature to this condition, while considerable has been written on herpes progenitalis which is also a relapsing disease.

While relapsing herpes of the face is not rare it is most frequently seen in the female, and usually occurs in early life, at ages from two to four years; its duration may be indefinite, the time between the attacks is not constant, as it may recur annually, semi-annually, or even have attacks at very short intervals. The seat of the eruption is usually the center of the cheek, and it favors the left cheek more often than the right, or it may attack the chin. It is not constant in its recurrence, as it may affect first one and then another part.

The eruption takes place at night without any premonitory symptoms, the child going to bed, feeling well, and awakens with a group of vesicles or a red patch on which the vesicles later form. The attack lasts from three to four days and heals in many cases with slightly depressed but very superficial scars which can scarcely be seen in day light but are visible when day is leaving. The general health of the child remains good.

The etiology of this disease is obscure.

Relapsing herpes bears a great resemblance to antipyrinic eruptions but differs from it that when the latter has healed, pigmentation, not scars, is left behind.

As to treatment, a few applications of an alcoholic solution of formal aborts it.

As regards its tendency to relapse and its localization it would seem to be of neurotic type, and treatment directed in this direction should certainly be successful to prevent relapses.

B. F. Ochs.

Retropharyngeal Abscess.—H. Irving Pinches, M.A., M.B., B.C. (British Med. Journ., Sept. 28, '07). This includes collections of pus both at the back and the side of the pharynx. It is exceedingly important to detect it as death may result from dyspnœa or bursting of the sac. They are most frequent during the first year of life. They are believed to start from infection through the tonsil or adenoids. They rapidly increase in size. The symptoms are (1) Difficulty in swallowing. The child won't eat on account of the pain. If a little milk is taken it is soon returned through the nose or mouth. (2) Difficulty in breathing. This is increased on lying down and the respirations are rapid. The main complaint is "cramp," "cough," "bronchitis." (3) Child is very sick; restless, perspiring, pale or cyanosed. (4) The neck is held rigid or the head retracted. (5) There may be a muffled cry. (6) The mouth may be open with saliva dribbling from the corners. (7) Swollen glands. (8) Nasal discharge.

On examination, the tonsil on one side is red and pushed forward and the cavity of the pharynx partially obliterated on that side. The swelling at the back of the pharynx is occasionally seen, but palpation with the finger is the surest guide and should never be omitted as it is exceedingly easy to detect an abscess by touch. The prognosis is always good after the diagnosis has been made. Discharge into the throat may cause fatal septic bronchopneumonia.

Treatment: Occasionally when seen early with the tissues behind the posterior pillars of the fauces, red, thickened and hard, but not fluctuating, pus formation can be prevented. This is done by means of alkaline antiseptic sprays, painting the tonsils with glycerine and carbolic acid, and administering potassium chlorate and a saline mixture. With recovery the tonsils should be removed. When pus is present it should be evacuated. An anæsthetic should be administered unless the dyspnœa is extreme. The child should be held in the dorsal position with the head well back to prevent pus getting into the trachea. A gag is used and the finger inserted to the abscess as a guide along which a knife (guarded to ¼ inch of the point with plaster or cotton) is introduced into the abscess. A large vertical cut is made.

The author states in closing that there is no good reason why so large a number of these cases should be overlooked.

Roger H. Dennett.

Alimentary Intoxication.—H. Finkelstein (Jahrbuch f. Kinderheilkunde, Oct., 1907) recognizes four stages: First, the "disturbance of the normal balance," then the "dyspeptic phase," then the "decomposition phase," and lastly "intoxication." All the various forms of alimentary disturbances are fundamentally the same, and all lead up to the final intoxication. All display the "paradoxical reaction" of injury of the organism, as shown in loss of weight, when the amount of food is increased. Besides this "paradoxical reaction," and the symptoms on the part of the stomach and intestines, he says that the weight, temperature, heart action, respiration, movements, composition of the urine and the psychic and nervous phenomena must all be taken into account. He cites a number of case histories to elucidate the various points he brings out.—Journ. A. M. A., Nov. 16, '07.

The Value of Gastric and Intestinal Lavage, as Well as of Internal Medication, in Catarrh of the Stomach and Intestines, in Children.—G. Hainiss (Abstracted in Allgemeine Wiener Medizinische Zeitung, Jahrg. lii., No. 42, p. 464, Oct. 15, 1907. Original read before the "Wanderversammlung der Ungarischen Arzte und Naturforscher" at the August meeting, 1907).

After his introductory remarks, the speaker said as follows: In the treatment of catarrh of the intestine, the rôle of the medicaments is a very important one, be the disease mild or severe. For, on the one hand, the protraction of this disease may occasion severe disturbances in the general nutrition of the body, or, on the other, a lesion at first mild, may, after long duration, become a severe one, capable of causing a complete exhaustion of the entire organism. Therefore, after having removed as well as possible the products of the disease, we must concentrate our attention upon such remedies as will exert a healing action on the diseased mucous membrane of the stomach. This goal, I believe, may best be reached by the use of astringents. In my hospital practice in St. Rochus Hospital, I have had the opportunity of trying nearly all of this class of drugs, and I have found that Houthin is by far to be preferred, and that it deserves our fullest confidence. I have employed it in more than 1,500 cases, and it has been only rarely that I have had to make use of any other astringent. It can be exhibited for a considerable period, without any disagreeable after effects. Indeed, it is better to continue its use a few days after the necessity for it seems to have receded, particularly when this result has been quickly reached. There have been cases, although they were few in number, on which it had no effect, or at least only a very indefinite one; but in these cases all other preparations of tannin were also useless. In such cases, preparations of bismuth proved best. But much more frequently bismuth would be found without effect, while the happiest results were achieved by the use of Houthin. The purpose of my short discourse was to emphasize the value of gastric lavage, and to direct the attention of my colleagues to the medicaments in general use, and particularly to Houthin, the preparation which, in practice, has given the best results and which, therefore, of them all deserves to be the most highly recommended. It is consequently known that this preparation represents a tannate of albumin, which is able to resist, as no other, the dissolving powers of the stomach, so that we may say that within this organ it is almost entirely insoluble.

Wm. H. Woglom.

Prolapse of Rectum in Children with Fifty Cases.—P. Lockhart Mummery, F.R.C.S. (British Medical Journ., Sept., '07).

The sexes in the 50 cases were about equal The causes he tabulates as follows:

Diarrhœa	14	Inflamed Prostate	1
Adenoids	13	Stricture of Bowel	1
Constipation	1	No ascertainable cause	16
Worms	3		
Polypi	2		
Pertussis	3		

The most common factor is general weakness and malnutrition caused by the above diseased conditions. The rectum is supported by the surrounding fatty cellular tissue and anything affecting the nutrition of the body takes away this fat and therefore the support of the rectum. The direct exciting cause, however, he attributes to the unnatural method of defecation of civilization, the normal position being to squat with the thighs flexed against the abdomen and this getting support for the rectum by the curve of the pelvis and the different position of the coxyx. He does not mention the use of the large adults' vessel or seat which is considered a cause in this country. For treatment he recommends improving the general condition by tonics, good nutritious diet, general hygiene and defecation in the squatting position. He does not approve of the reclining position during defecation. Of course adenoids and polyps are removed and local lesions treated when present. He operated for prolapse in six cases only, five with linear cauterization, one with transverse incision.

Roger H. Dennett, M.D.

Milk As Affected by Stable Practices and Subsequent Handling.—H. M. REYNOLDS (St. Paul Med. Journ., Oct., '07). The author deals with the practical question of furnishing good milk to the consumers. He mentions as the chief sources of pollution: (1) Dust in the atmosphere, by sweeping and dry feeding. (2) Unclean cows. (3) Dirty hands of milkers. (4) Clothing of milkers. (5) Unclean utensils. (6) High temperature, utensils and exposure to dirt in transit. (7) Impure ice and water in diluting or in washing utensils.

Dust experiments were carried on by exposing agar culture plates to the air in a barn under different conditions. A barn that had been empty and quiet for several hours showed only half a colony per plate; after the cows came in, were given dry feed, the barn swept, etc., the plates showed as high as 412 colonies, and after dry brushing of the cows 858 colonies. Cows with unwiped udders produced a milk with 10 times as many bacteria as cows whose flanks and udders had been wiped with a damp cloth. One hair may have upon its surface 3,000 bacteria. The author calls attention to the enormous difference this would make in the bacteria count at the time the milk was consumed after it had been hauled 50 miles at a high temperature, one organism dividing every 30 minutes makes them multiply 17,000,000 in 24 hours.

Dirt found upon the cow or upon milkers' clothing contained up to 80,000,000 bacteria per gram, and taken from the creases of the milk pail nearly as high.

Expensive dairy plants are not necessary for the production of a clean milk. The market milk winning the gold medal in Paris was produced in a barn well lighted and ventilated and had cement floors. The walls and ceiling were kept whitewashed and the manure was hauled directly to the field. Special care was taken to avoid dust near the time of milking and cows were kept clean. Covered milk pails should be used and the hands of the milker cleaned before milking. A clean duster kept for the purpose is slipped on over the milker's clothing. The milk should be rapidly cooled and kept cool, all utensils being clean. Certified milk produced under the proper conditions kept sweet five weeks. The physician should educate the people to the value and importance of clean milk. It takes an intelligent man with executive ability and agricultural knowledge to produce clean milk, and the cost is increased. The people should therefore expect to pay more, as in no article of diet is it more important to have purity.

ROGER H. DENNETT.

Cretinism.—Louis Fischer in the Monthly Cyclopedia of Practical Medicine, states that instead of supplying the absent thyroid secretion and by this means regulating the internal glandular machinery, we find that by supplying the desiccated thyroid gland we stimulate to reactivity all glandular functions hitherto deemed passive. What at first appears to be a simple phenomenon turns out to be a very complex problem, for the solution of which we are indebted to the manifold teachings of Sajous. In no branch of therapeutics can so much progress be found as in the treatment of sporadic cretinism. To transform a human imbecile, backward mentally and also physically, into a normal being is something of which the physicians may be proud. One of the earliest symptoms met with in sporadic cretinism is constipation. This is chiefly due to muscular atony and also to the absence of intestinal secretions. This absence of secretion is evident because the stool is hard and dry, and usually of scybalous type. As soon as the dessicated thyroid is given to a cretin the stool is softer and there is evidence of intestinal lubrication, due to the activity of the intestinal glands. Another favorable symptom is the restoration of the function of the sweat glands. He cautions concerning the toxic effect due to an over-dose of the thyroid extract. The stimulus exerted by the thyroid extract on the vascular centers frequently causes flushing of the face and marked restlessness with rapid pulse rate. Five grains of the desiccated gland may be given in divided doses in one day, an equivalent of 1-16 of an average sheep's thyroid gland. Some cases will respond to half this dose while others may require more. The first evidence of too large dosage is evidenced by gastroenteric disturbance with vomiting and diarrhœa and fetor ex ore. There may be abdominal pain and tenderness, besides very rapid loss of weight. Blood examination shows marked distinction of the red corpuscles. Some clinicians have prescribed iodin and the iodids as a substitute for the thyroid, but prolonged trial has proved them of no value.—Cleveland Medical Journal.

Leukaemia with Leucopenia.—Sluka (Gesellschaft f. Innere Medicin u. Kinderheilk. in Wien. Centralbl. f. Kinderheilk., April, 1907, S. 140) showed a patient, a girl aged nine years, who had been getting paler for four months. General enlargement of the lymphatic glands had appeared a few weeks previously, and multiple petechiæ were present. The anæmia resisted all treatment. The blood examination gave: red corpuscles 2,684,000, color index 0.65, leucocytes 2,000, lymphocytes 91 per cent., polymorphonuclears 0.5 per cent. The lymphocytes were larger than usual. The diagnosis was acute lymphatic leukæmia, of the variety called by von Türk alymphæmic lymphomatosis.—Brit. Journ. Chil. Dis., Oct., '07.

A Plea for the Cross-Eyed Child.—John Green, Jr., M.D. (Interstate Med. Journ., Nov., 1907). Green asserts that the general practitioner is prone to minimize the seriousness of strabismus in infants relying on "their growing out of it." While this may occur it is the exception rather than the rule. He believes with Claude Worth of England that strabismus is due to a defect in "fusion faculty" often associated as Donders has taught with hypermetropia. By "fusion faculty" he means that ability to blend mentally the images received on the retinæ of the two eyes. This is absent at birth, the binocular vision appearing as early as the sixth month. And complete by the end of the sixth year. When this is well developed "nothing but actual muscular paralysis can cause an eye to deviate." In some cases, owing to congenital defect, this fusion faculty may develop late or not at all. Then, anything which disturbs the balance of motor co-ordinations will cause squint, and such disturbances are, in order of importance, (1) hypermetropia; (2) unequal refraction in the two eyes; (3) congenital amblyopia; (4) a tendency of one of the eyes to turn up or in; (5) specific fevers; (6) convulsions or severe fright; (7) hereditary influence. At first the eye which turns possesses equally good vision as the straight one, but by disuse becomes weaker progressively, until in time is so blind as to be limited to counting fingers. Treatment should be begun early by accurate correction of refractive errors, forcing the use of the weaker eye, with atropin in the fixing eye, training the fusion sense, and lastly, by operation.

Worth records instances of infants at twelve months wearing glasses satisfactorily, and Green mentions one of eighteen months using strong plus spherical lenses with excellent results. When operation is resorted to, the cosmetic effect may be perfect but the improvement of vision in the poorer eye is usually most unsatisfactory. It is therefore the duty of the physician to teach parents the disastrous results of neglect and delay in caring for these unfortunate children.

J. M. Heller.

Some Needs of Institution Children.—John Ruhräh (Journ. A. M. A., Nov. 9, 1907), in discussing the failure to properly raise children in institutions, says that there are two chief causes, first a lack of funds and secondly, bad management on the part of the lay managers. The cost per day of properly caring for an infant under one year is one dollars. The medical staff should have absolute control.

Bad ventilation and lack of air space are often met with.

One thousand cubic feet of space should be provided for each child, there should be a day room and sleeping room; the sick should be separated from the well and a special room should be provided for the congenitally weak ones.

The nurses and attendants should be of such a class that they can be trusted to interest themselves in the work and properly execute the same.

The children should be out of their cribs, and out doors as much as possible, and in regard to the feedings, while it should be individual as much as possible it is a good plan to have one or two working formulas, as fat 3 per cent., protein 1 per cent., and sugar 6 per cent.; or fat, 4 per cent., protein 2 per cent., and sugar 7 per cent.; these can be used for a majority of the babies, diluted with water where necessary.

A. Jackson.

Prophylaxis in Epidemic Cerebro-Spinal Meningitis.—A. Seibert (Journ. A. M. A., Nov. 16, '07) says: (1) Epidemic cerebro-spinal meningitis is communicable only by direct contact with fresh mucus from the nasopharynx of patients.

2. A person who has taken the germ from a patient may acquire the disease.

3. Such a person may only acquire meningococcus pharyngitis and, thus acting as intermediary host, may carry this infection to others near and far.

Post nasal catarrh, so common in children, furnishes an excellent medium for the culture and lodgement of the meningococcus. He has for the past twelve years used a solution of equal parts of resorcin and alcohol to disinfect the nasopharynx. A plug of absorbent cotton wound around the end of an applicator and dipped into the solution is introduced into the nasopharynx and after two seconds is withdrawn. This is repeated every other day and six applications usually stop all secretions.

The author ends by saying that as a prophylactic measure it should be used in all cases of epidemic cerebro-spinal meningitis.

1. In the nasopharynx of the patient to prevent further absorption as well as expectoration of meningococci.

2. In all persons coming in contact with a patient, especially when post nasal catarrh is present. A. J.

Vital Properties of Milk.—M. Coplans (Lancet, Oct. 19, '07). In an important article Coplans details the results of a series of experiments arising out of a desire to investigate the comparative reactions of new milk, stale milk, frozen milk and boiled milk toward organisms which, though capable of flourishing in milk, both at air temperature and at blood heat, occur normally in the alimentary tract. From these experiments he finds that the factors controlling the growth of organisms in milk are explicable on the ground of inhibition and latency: 1. New milk possesses certain properties not possessed by boiled milk, manifested toward certain organisms as a process of inhibition of growth, absolute at first, later only partial. 2. New milk possesses certain bactericidal powers, which for the first six hours destroy certain of the organisms, and stay any increase of growth among the remainder. These bactericido-inhibitory properties of new milk are vital; they are destroyed in the process of boiling, and wane with the lapse of time. By latency is understood the series of phenomena, latent period and comparative latency, or absolute and relative quiescence, which first characterize the growth of organisms in an altered environment, e.g., as to food supply, acidity or temperature. The expiration of this latency has lent color to the highly erroneous belief that there have been several additions of organisms to the milk investigation, by reason of the sudden increases in number at frequent intervals. Two other results of the experiment are that the action of preservatives is to damage the bactericido-inhibitory action of milk, as well as to restrain the growth of organisms; and that the facts relating to this action of new milk form the basis of a method for estimating within certain limits the period which has elapsed since the time of milking. The author sums up his conclusions as follows:

"In the case of the breast-fed infant every feeding serves to hold at bay and diminish the number of organisms present in the stomach. With new milk under ideal conditions of collection and delivery to the household, for only 3½ hours out of 12 hours is the bactericido-inhibitory property effective. With boiled milk inhibition, absolute or partial, toward organisms on the part of the milk is entirely absent. With preserved milk, as soon as the percentage of preservative is lowered by dilution or absorption so that it ceases to check the growth of organisms the milk acts as in the case of boiled milk. With the presumption that the preservative is added at the time of milking and that the delivery of preserved milk takes place twice daily without delay and that the preservative has no harmful effect on the inhibitory power of the milk, nor is on its own account prejudicial to the infant, the effect would be as in the case of new milk. But the presumption that the preservative has no prejudicial effect to the inhibitory properties of milk is disproved by direct experiment and apart from the question of the toxic action of the preservative the milk acts as in the case of boiled milk and of itself affords no measure of protection against the growth of organisms in the bowel.—Journ. A. M. A., Nov. 16, '07.

Influence of Composition of Food on Lime Metabolism in Infants.—O. Rothberg's (Jahrbuch f. Kinderheilkunde, Oct., 1907) research demonstrates that the composition of the food has a direct and important influence on the lime metabolism. When there is much fat in the milk given a group of bottle-fed infants, the balance of lime was negative, while it was positive always in another group fed with skimmed milk. The amount of lime ingested seems to have only a secondary influence on the lime metabolism, which is influenced most unfavorably by fat and next by carbohydrates. The retention of lime in the experiences related was dependent on the greater or less proportion of fat in the food, even in some rachitic children. The processes that determine retention of lime occur in the intermediary metabolism and in the intestines. It seems to be the rule that intake of fat induces increased elimination of alkalies and of alkaline salts. As only a small amount of neutral fat is eliminated, there must be a formation of calcium soaps from the products of the splitting of the fat. Czerny has also reported the observation of a long series of severe cases of rachitis in children fed with whole milk. Rothberg is convinced that the fat in the whole milk was probably responsible for the loss of lime in these cases.—Journ. A. M. A., Nov. 16, '07.

Importance of Molecular Concentration of Food Given to Infants.—G. B. Allaria (Jahrbuch f. Kinderheilkunde, Oct., 1907) raises a warning note in respect to the great importance of the concentration of fluids fed to infants. The molecular concentration should be approximately the same as that of the blood. When more concentrated, the organic juices are attracted into the digestive tract and diarrhea is liable to result, with far-reaching disturbances. The advantage of a water diet in enteritis is principally due to the rapid absorption of the hypotonic water, counteracting the depletion of fluids and inducing copious diuresis. It is a simple matter to determine the molecular concentration of the infant's food by means of cryoscopy. He gives the tabulated finding in respect to the molecular concentration of the stomach content after a test meal, the electric conductibility and the internal friction. The tests reported were made repeatedly on seven infants and were repeated several times after the test meals.

Some of the facts observed suggest that the stomach wall absorbs water. The osmotic phenomena observed in the stomach, while unmistakably apparent, yet proceed so very slowly that the stomach contents are passed along into the intestines long before an osmotic balance has been reached. The osmotic interchange proceeds rapidly and unhindered in the intestines, and explains many points in clinical experience, such, for instance, as the cure of diarrhea by omitting sugar from the infant's food, when it is found that the mother has been giving it considerable sugar. If the food is highly concentrated there is liable to be serious intoxication: Keller has reported the rapid death of rabbits fed with a strong solution of sugar: the same thing occurs when they are fed with a strong solution of salt which attracts water copiously into the intestines, leaving the tissues drained of their normal quota. It should be made a rule in infant feeding and in weaning infants, he declares, to have the molecular concentration of the food approximately the same as that of the blood. —Journ. A. M. A., Nov. 16, 1907.

The Most Frequent Hernia in Childhood.—Dr. E. M. Carnes (Amer. Journ. Med. Science) reports his observations covering 3,300 cases, and concludes the most common hernia in children is median ventral hernia above the umbilicus. The frequency of this form increases from birth, to attain its maximum in the second year, then it falls rapidly and is rarely seen in adults. Because of this fact he argues that it is an acquired character and cures itself. Of all hernias examined by him in infants, 87.1 per cent. were of the median ventral variety alone or of this variety associated with other hernias. This variety of hernia is of especial importance as bearing upon the etiology of hernia in general, and therefore upon the treatment of hernia in children especially. His studies lead him to believe that congenital hernia in children is less common than acquired hernia. Hernia in infants is often due to an increase of intra-abdominal pressure due to gas formation, and the rational treatment would seem to be not surgical but medical. Stop the intestinal fermentation and the hernia will cure itself.—Med. Bulletin, Nov., '07.

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